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THE IRON AGE

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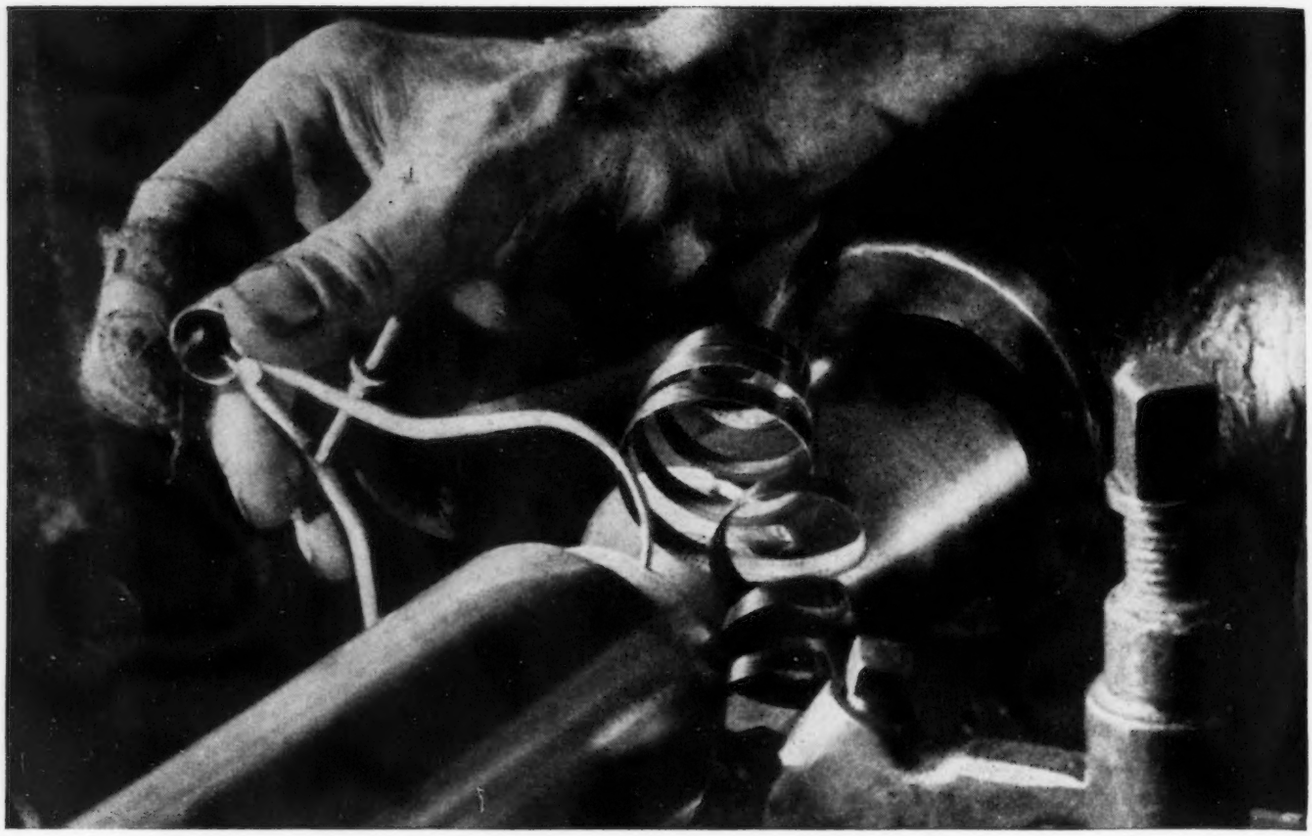

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▲▲▲ THE IRON AGE ▲▲▲

MAY 9, 1940

ESTABLISHED 1855 Vol. 145, No. 19

A Prior Lien on Purchasing Power

LAST week I called your attention to the accumulated underbuying of capital goods in the United States that has amounted to at least $34 billion during the past 10 years. Underbuying that has accompanied the drying up of the flow of investment funds caused primarily by lack of confidence in the New Deal and its works.

I stated that as a corollary to this underbuying there had been an accumulation of "over savings," during this same period, amounting to $17 billions. Timid money that is afraid to go places for fear of meeting with Mr. Roosevelt and his pals, the tax, lend and spend boys.

One way to increase purchasing power in the United States, and to materially reduce unemployment, would be to coax this timid savings money out of hiding. And the quickest and most effective way to do that would be to run the quacks and communists and "something for nothing" advocates out of office and out of power in Washington and elsewhere. That may happen on Nov. 5 and, if it does, you will see a revival of capital goods activity overnight that will be amazing.

But savings are only part of purchasing power. The run-of-mine everyday purchasing power of America resides in pay envelopes, salary and dividend checks and other forms of current income. In fact, the gainfully employed people in this country furnish nearly 70 per cent of this current purchasing power. It is spent largely for consumer goods, but these in turn call for capital goods in the way of plant and equipment to make them.

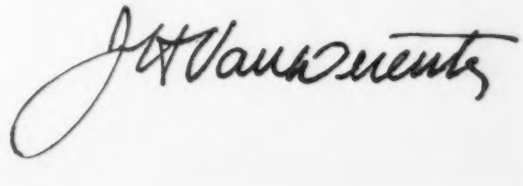
The purchasing power of your income is what you have left after you pay your taxes. And taxes today, thanks to a tax, lend and spend Administration, amount to considerable, as you are aware who make out personal or corporate tax returns.

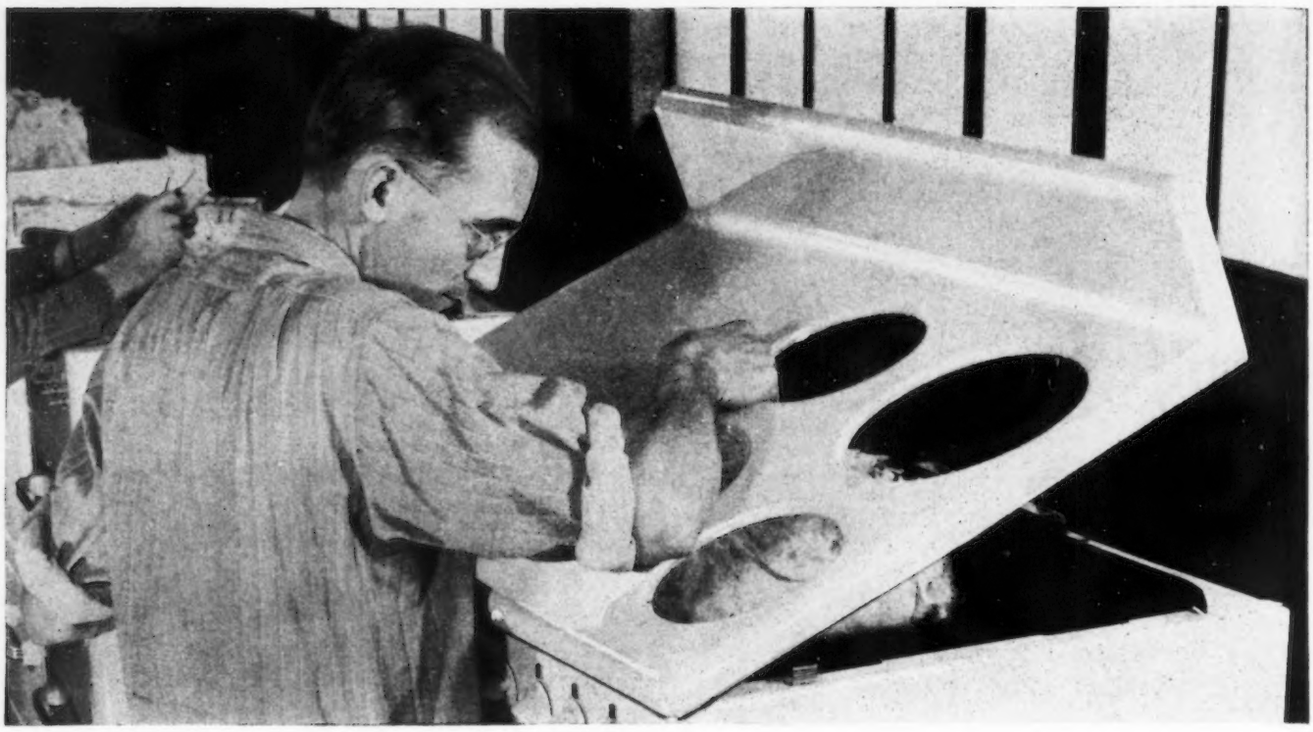
What is not known to the majority of wage earners who are exempt from these direct taxes is that the average man is paying at least 20 per cent of his wages to Uncle Sam in the form of concealed taxes.

Here is another brake on consuming power, the consuming power of income, that is just as serious and damaging as the brake on investment.

The AFL recently stated that a six per cent increase in wages in our manufacturing industries would give us enough additional purchasing power to abolish unemployment. Wages in industry apply to approximately 11 million workers. But taxes are paid by every man, woman and child who has a dollar or a penny to spend.

A two per cent decrease in concealed and other taxes applying to 130,000,000 Americans would abolish unemployment much faster than the pay rise. For such evidence of the Government's intention to economize would encourage timid dollars, whereas a pay rise might drive them further into the storm cellar.





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SPECTROGRAPHIC ANALYSIS OF STEEL

By J. L. GREGG and P. R. IRISH
Research Engineers, Bethlehem Steel Co., Lackawanna, N. Y.

STEEL can be quickly and cheaply analyzed spectrographically, with an accuracy comparable with routine wet methods. How this is done, the equipment used, and the results obtained are all dealt with herein by the authors.

DEVELOPMENT of accurate and rapid methods for determining the numerous alloying elements is a question of primary importance in the manufacture of quality steels. The need for accuracy is so obvious that it requires no further emphasis. As far as the rapidity of the determinations is concerned, it may be stated as a general rule, that the greater the speed with which an analysis can be made, the greater the possibility of accurate control of the steelmaking operations. Chemical methods of steel analysis have been developed to the point where accurate determinations of all important elements are feasible, although at considerable time and expense for many of the elements.

Recently the development and research department of Bethlehem Steel Co., in collaboration with the Department of Engineering Research and the Physics Department of the University of Michigan, has carried out extensive investigations on quantitative spectrographic analysis of steel.

These investigations have brought out, that such determinations can be made rapidly and economically for all of the elements commonly found in steel, with exception of carbon, sulphur, and possibly phosphorus, and with an accuracy at least equal to that of routine wet methods, provided the elements are not present in amounts exceeding 3 to 5 per cent. While the initial cost of the spectrographic equipment is high, the methods are rela-

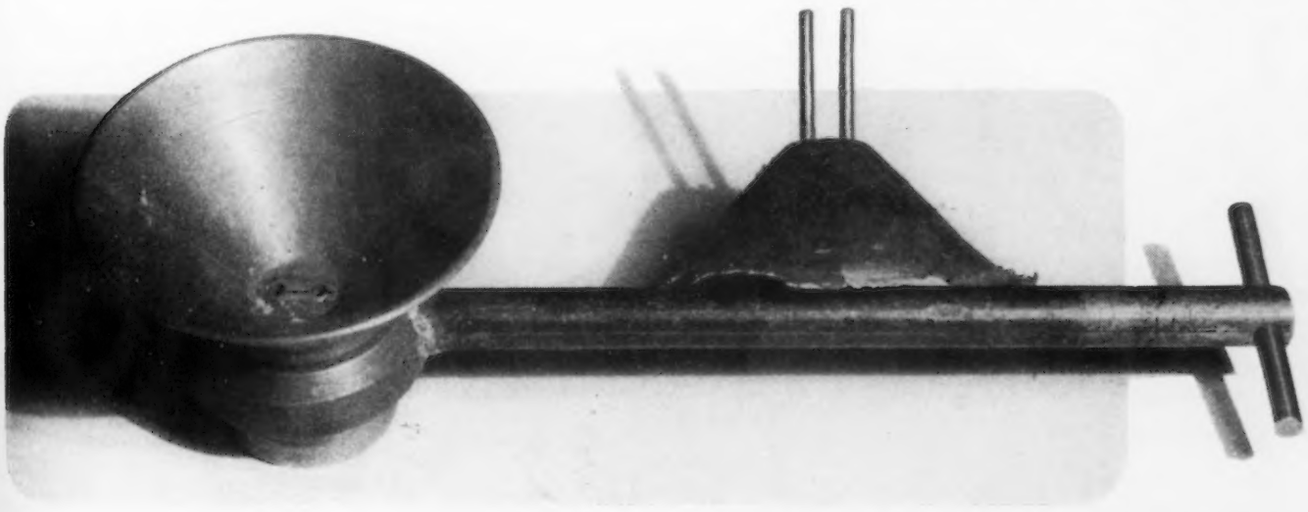
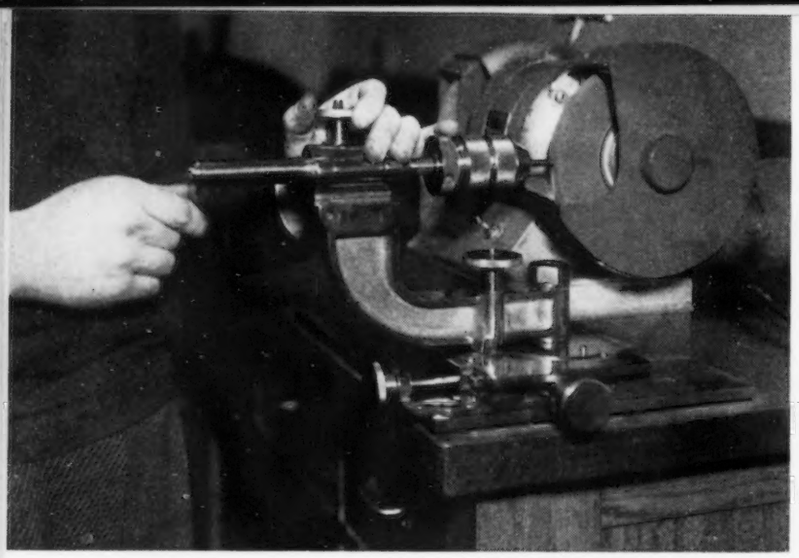


FIG. 1—This type of mold is used in casting specimens for spectrographic analysis.



AT LEFT

FIG. 2—Grinder with special attachment for preparing the ends of test specimens.

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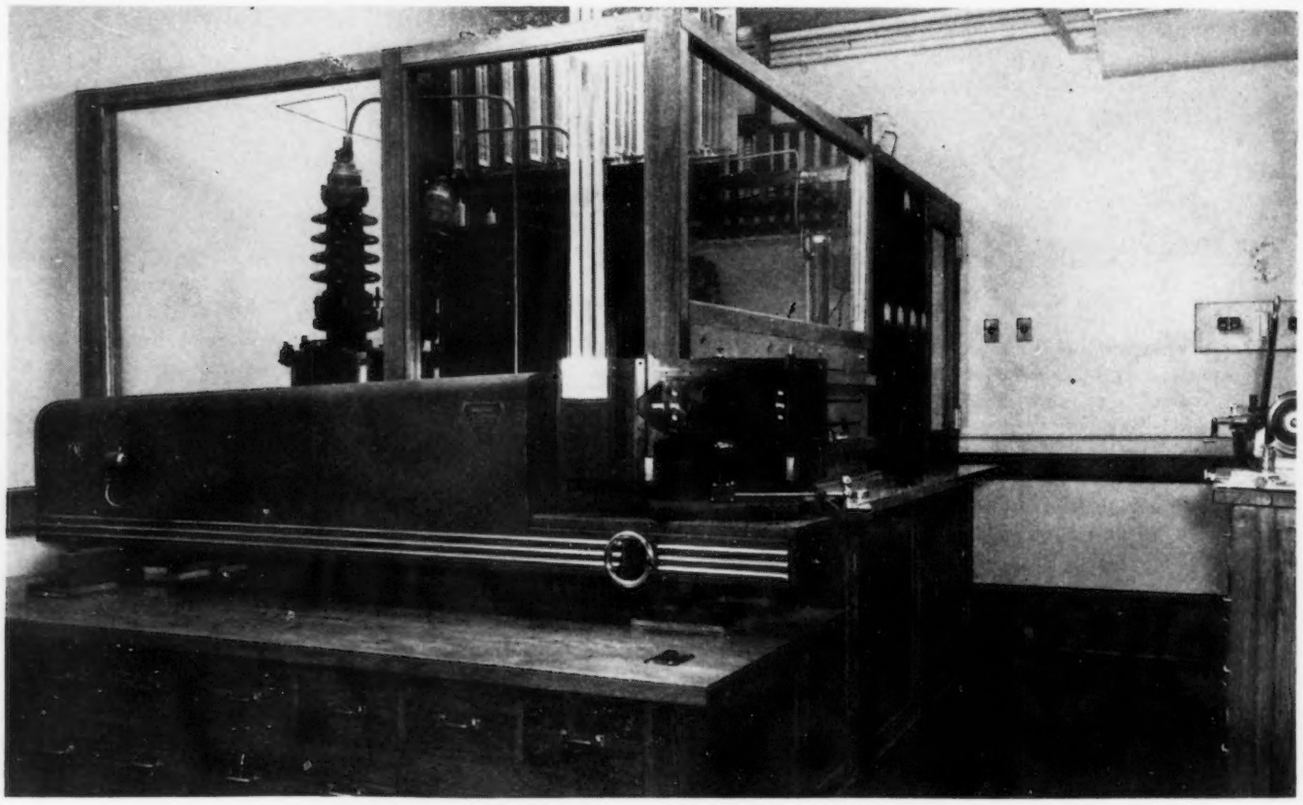
BELOW

FIG. 3—General view of the spectrographic equipment.



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AT RIGHT

FIG. 4—This holder is used for clamping specimens for sparking or arcing

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tively simple and do not require a highly trained spectrographer. Furthermore, the analyses can be made in very short time, and the cost per determination is gratifyingly low.

The most desirable specimen for use in spectrographic analysis is a rod of small diameter, cast in a mold of the type shown in Fig. 1. Two rods of 7/32-in. diameter and 2 in. long are cast at one time. These are broken or cut from the head and used for analysis. A diameter of 7/32 in. was selected because it is the smallest size rod that can be conveniently cast on the pouring platform. When the two rods required in each test are received at the spectrographic laboratory, the ends are made spherical in a grinder with a special attachment (Fig. 2), an operation requiring less than a minute's time. By means of a special jig the rods are then inserted into the clamps of the sparking fixtures, spacing them with the ends 5/32 in. apart.

Except in the case of a few elements present in only very small amounts, a high voltage spark discharge is used in practically all determinations. Identical discharge conditions are rigorously maintained for all analyses, and only two sparking times are used. In practice, only one sparking interval is required, as one strip of the plate is shielded part of the time to give two exposures for each sparking time. All of the elements commonly determined may be obtained on a 10-in. plate used in a Littrow spectrograph.

The elements present in very small quantities and not determinable by sparking are analyzed with a high voltage arc discharge. Analyses with the arc discharge are made for copper in amounts below 0.02 per cent, tin below 0.10 per cent, chromium below 0.02 per cent nickel below 0.08 per cent, aluminum below 0.10 per cent, vanadium below 0.02 per cent and molybdenum below 0.10 per cent.

A general view of the laboratory at the Lackawanna plant, housing the spectrographic apparatus, the electrical control equipment and the grinder, is presented in Fig. 3. The holder used for clamping the specimens for sparking or arcing is shown in Fig. 4. By moving the holder along the track it is possible to vary the distance between the source and the slit. The equipment may be used with water cooled clamps as required in arcing, or without water cooling as done in sparking.

The spectrograph proper is a Littrow instrument, which for practically

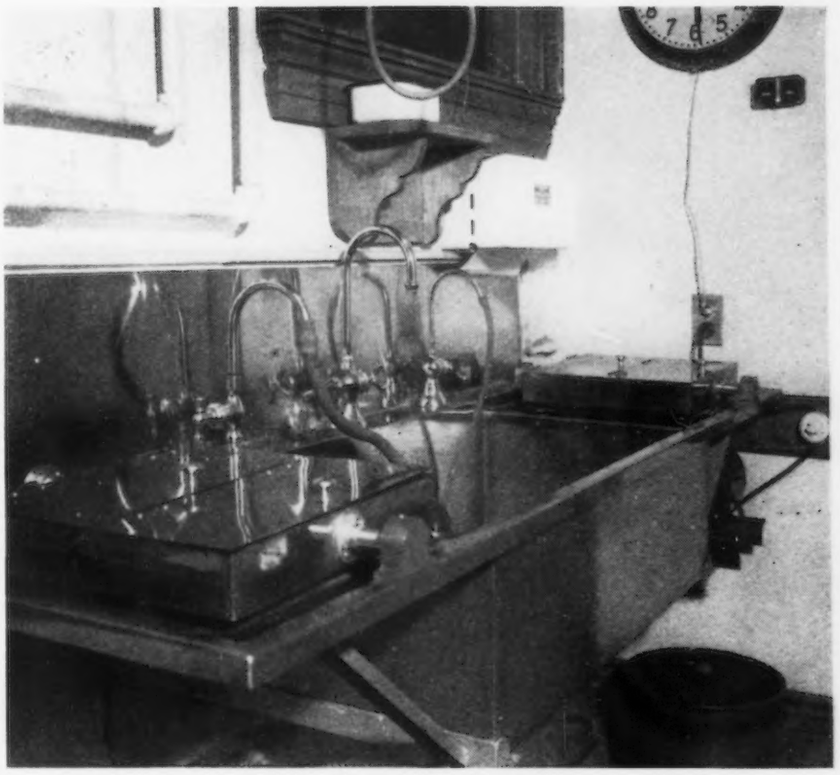

FIG. 5—Dark room with equipment for developing the plates.

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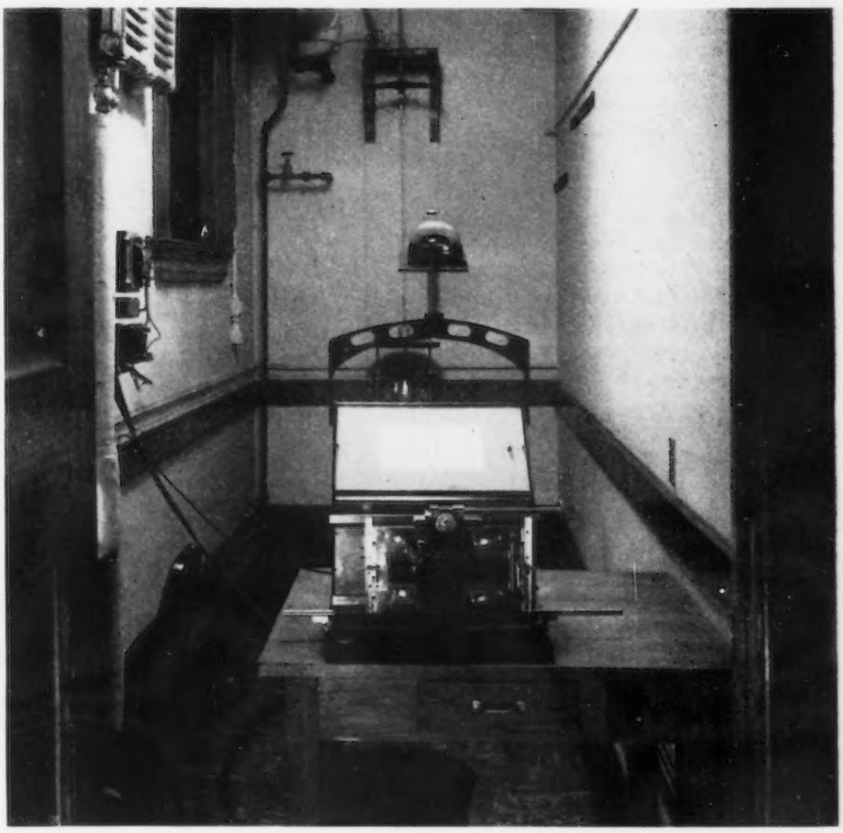
FIG. 6—Microphotometer used in determining the density of the selected lines.



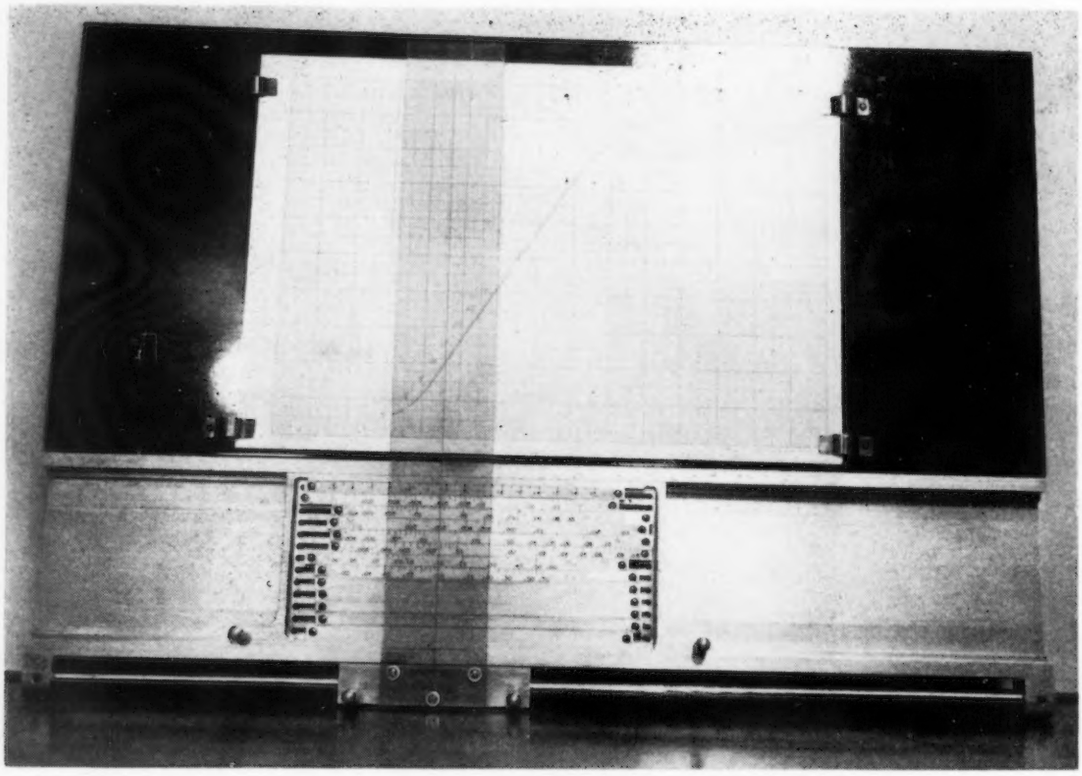


FIG. 7—Transposing board used for determining the amount of any particular element present.

all of the work is set for a range of 2650 to 4000 angstrom units. The scale printer, which normally is a standard part of the equipment, has been replaced by a bar covering half of the area of the plate exposed and operated in such a manner that two different times of exposure are obtained with a single sparking. As many as 18 exposures are made on a single plate, either Eastman Spectrum Analysis No. 1 or Cramer's Contrast plates.

Fig. 5 shows a corner of the dark room with sink and rockers containing developer and hypo on each side of the sink. The plates are developed for 1 min. in D-8 developer and are left in the hypo until cleared (30 sec. for Eastman plates and 1 to 1½ min. for Cramer plates). They are then washed for ½ min. in a special rack in the sink, and dried in a heater at as high a temperature as may be safely used.

The density of the selected lines on the plate is determined with the microphotometer shown in Fig. 6. This is a Bausch & Lomb instrument that has been remodeled to make it satisfactory for accurate routine work. For each plate certain iron lines are microphotometered and from the readings a gamma curve is drawn for the plate on the transposing board shown in Fig. 7. The densities of the desired lines of the element to be determined and certain of the iron lines are then read with the microphotometer. From these readings the amount of each element can be obtained by simple operation of the transposing board.

Extensive work with spectrographic methods at the Lackawanna plant has indicated that when the concentration of the metallic elements does not exceed 3 per cent, the accuracy is at least equal to that of conventional wet methods. For higher concentrations the accuracy is sufficient for routine control. Analyses of several heats by both chemical and spectrographic methods are given in Tables I and II.

In considering the accuracy of the method it should be kept in mind that spectrographic results are based on calibration curves determined from

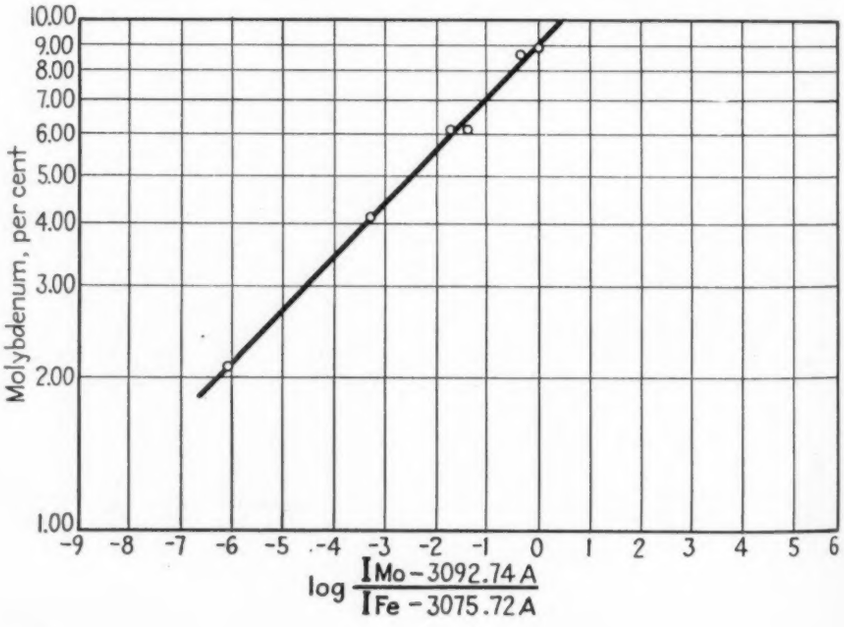


FIG. 8—Calibration curve used in the determination of molybdenum.

samples of known composition. One of these curves is shown in Fig. 8, in which the ordinate is the logarithm of the molybdenum content and the abscissa the logarithm of the ratio of the intensity of the molybdenum line 3092.74 A. and the iron line 3075.72 A. In order to determine the accuracy of molybdenum determinations for contents in the neighborhood of 8 per cent, a sample of molybdenum steel was analyzed 124 times, using the curve shown in Fig. 8. The average of the 124 determinations was 8.30 per cent, with a minimum of 7.99 and a maximum of 8.56 per cent. Maximum deviation was, therefore, 0.57 per cent or ± 0.285 per cent, which is ± 3.43 per cent of the molybdenum content. The standard deviation was 0.125 per cent, or 1.51 per cent of the molybdenum content. This would indicate that two-thirds of all determinations should lie between 8.175 and 8.425 per cent.

The suitability of the method for determining chromium was demonstrated by analyzing a sample of chromium steel 58 times. Average of all determinations was 2.23 per cent, with a minimum of 2.16 and a maximum of 2.30 per cent. This gives a maximum deviation of 0.14 or ± 0.07 per cent, which is ± 3.14 per cent of the chromium content. The standard deviation was 0.037 per cent, or 1.66 per cent of the chromium content.

Finally, a sample was analyzed for manganese, 51 determinations being made. The average result was 0.405 per cent, with a minimum of 0.396 and a maximum of 0.415 per cent. Maximum deviation was, therefore, 0.019 per cent or ± 2.3 per cent of the manganese content. Standard deviation was 0.0062 per cent, or 1.53 per cent of the content.

The figures given and similar data not shown here bring out that the spectrographic methods used by Bethlehem give results with standard deviations not exceeding 2 per cent. This indicates that when the elements are not present in too high amounts, say not above 3 per cent, they may be determined spectrographically with an accuracy at least equal to that of standard chemical methods.

TABLE I

ANALYSES OF COPPER-BEARING STEELS

Heat	Manganese, Per Cent		Copper, Per Cent	
	Spectrographic	Chemical	Spectrographic	Chemical
A	0.41	0.38	0.30	0.31
B	0.47	0.48	0.26	0.27
C	0.82	0.83	0.22	0.24
D	0.38	0.37	0.25	0.20
E	0.41	0.38	0.24	0.24
F	0.71	0.71	0.22	0.22
G	0.80	0.83	0.23	0.23

TABLE II

ANALYSES OF MOLYBDENUM STEELS

Heat	Manganese, Per Cent		Tin, Per Cent		Molybdenum, Per Cent	
	Spectrographic	Chemical	Spectrographic	Chemical	Spectrographic	Chemical
H	0.84	0.84	0.26	0.27	0.26	0.24
I	0.74	0.77	0.26	0.26	0.24	0.24
J	0.74	0.79	0.24	0.29	0.22	0.24
K	0.87	0.83	0.28	0.28	0.26	0.26
L	0.84	0.83	0.26	0.28	0.26	0.28
M	0.88	0.89	0.26	0.29	0.25	0.26
N	0.89	0.89	0.27	0.29	0.27	0.26
O	0.80	0.82	0.25	0.27	0.26	0.27
P	0.70	0.70	0.23	0.25	0.25	0.23
Q	0.68	0.68	0.23	0.26	0.23	0.24
R	0.80	0.86	0.25	0.24	0.23	0.23
S	0.87	0.92	0.27	0.29	0.18	0.18
T	0.85	0.89	0.26	0.26	0.30	0.30

K-42-B—A New Westinghouse Alloy

A SIGNIFICANT alloy recently developed by the Westinghouse Research Laboratories is K-42-B, said to be stronger than any known steel. It contains only 7 per cent iron, but yet retains its strength at temperatures higher than 2000 deg. F.

A result of almost seven years of work by Westinghouse research metallurgist P. H. Brace, K-42-B is a first cousin of another Westinghouse alloy known as "Konal"—a practical substitute for platinum in oxide-coated radio tube filaments.

The new K-42-B is stronger at 1100 deg. than ordinary low carbon steel is at room temperature. Furthermore, it has a low damping coefficient—or in other words, it retains its elasticity—at such elevated temperatures. To illustrate this property, Mr. Brace has two small bells—one of steel, the other of K-42-B. Heated to 1100 deg. F., the steel bell responds to a hammer blow with only a thud, but the new metal rings with a clear, resonant tone.

Almost half of K-42-B is nickel, and about a quarter is cobalt. But it has other components including chromium, titanium, and iron. Production of the metal on a commercial scale is said to be practicable, but its first cost will be high, and its immediate uses are expected to be those of a special-purpose alloy for dies, valves, steam fittings, possibly turbine blades, or other applications requiring temperature-resistant metals.

The new alloy "creeps" a great deal less than other metals in its class. Sample rods of the metal were loaded in tension to produce a stress of 20,000 lb. per sq. in. and heated in an electric creep-testing furnace for 6000 hr. at a constant temperature of 1000 deg. F. At the end of the test, K-42-B showed a yield of only 0.0001 in. for each inch of its length, and most of this had taken place during the first few hours. Under the same conditions a sample of high-strength nickel-chromium steel yielded 100 times as much. It is said that cast carbon-molybdenum steel would have failed completely, long before the 6000-hr. mark was reached.

RESISTANCE WELDING... T

By LAWRENCE D. JENNINGS
Manufacturing Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh

o o o

RESISTANCE welding is the art of uniting metals under pressure by passing an electric current through a local area until a welding temperature has been reached. Welding temperature is dependent upon the material being joined, and is usually the melting point of the alloy. Non-ferrous alloys all require melting-point temperatures but ferrous alloys can be welded at temperatures below the melting point. Low carbon mild steel, for example, has a very wide plastic range and when pressure is applied to two pieces at this temperature, the growing grains of one piece will interlock with the grain structure of the adjacent piece and a homogeneous union will be formed.

To perform this welding cycle, it is necessary to have a machine that will pass a high current through a local area of the metals to be joined and supply the necessary pressure at this heated point. The high current is obtained from a specially designed transformer. Fig. 1 shows a schematic diagram of a resistance-welding machine. The transformer consists of a primary and secondary winding, and leads are taken from the secondary to two electrodes A-A that can be closed by pressure upon the work B.

When electric power is supplied to the primary, a stepped-up current flows from the secondary to the electrodes and through the work B. The resistance of the work B and the contact resistance between the work causes heat to be generated at C and D, and the pressure exerted upon the work by the electrodes unites the two sheets at D when the welding temperature has been reached.

Temperature variation through the work at the point of welding, if plotted as a curve, will show three peaks of high temperature, as shown in Fig. 2. Peak A is a point between the sheets at the area to be welded, point B is a point within the sheet nearer to the surface of the sheet adjacent to the electrodes. C is the point between the sheet and the electrode, while D is a point in the electrode a short distance from the electrode face. The contact resistance between the sheets themselves and the electrodes is responsible for the high peak temperatures. The theoretical ideal condition would be attained when peak A approached infinity and peaks C and C¹ approached zero. This condition is not easily secured and is probably not greatly desirable. At times, a point is reached where the contact resistance is equal at all three points, A — C — C¹, as when welding copper, and then a weld may be made at any or several of the three points.

Contact resistance depends upon: (1) The surface condition of the work to be welded. That is, whether the surface is smooth, rough, scaly or dirty. A smooth surface has a lower contact resistance than a rough, scaly or dirty surface; (2) type of material, whether it has a high or low electrical resistance; (3) type of electrodes, the variables of which are size, shape, surface condition, and electrode material; and (4) pressure forcing the tips together. The greater the pressure the less the contact resistance.

The power required to make a weld is determined by the heat generated at the point of welding. Heat is a product of the current squared and the resistance ($H = I^2R$). R is a function of the contact resistance and varies inversely as the welding pressure. When the pressure $P = \infty$, $R = 0$, then $H = I^2 \times 0 = 0$ (see Fig. 3). Power is the product of the current, the voltage across the work, the time the current flows, and a suitable factor for heat loss ($W = IVTK = I^2RTK = HTK$).

Resistance of the welding circuit to be welded is an important factor in determining the power necessary. This resistance is composed of the resistance of the material itself and the contact resistance between the sheets

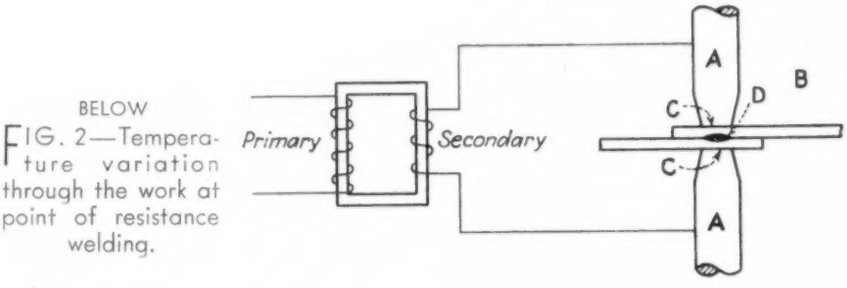
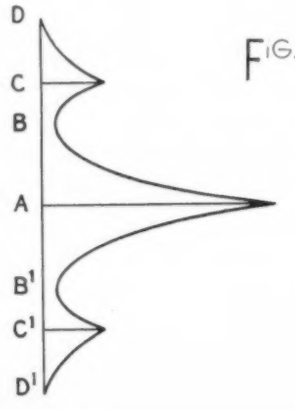


FIG. 1—Schematic diagram of the resistance welding process.

BELOW
FIG. 2—Temperature variation through the work at point of resistance welding.



..The What, Why and How...

being welded. The material resistance is of minor importance and has very little bearing upon the power required and cannot be used to estimate the power necessary to produce a weld.

Welding Machines

The welding machine is a tool used to produce a resistance weld. Spot, seam, butt and flash welders are varieties of welding machines and each has an individual task to perform. The spot welder is the best known machine and is designed to join two or more sheets of material at a spot by passing a high current through two pointed electrodes as they exert pressure upon the sheets.

A seam welder is a variation of the spot welder. The pointed electrodes are replaced by rollers and as they rotate the work passes between them under pressure and a series of spots are made by high current pulsations. Butt welders are used to butt two objects together—usually rod bar or pipe. The rods are securely clamped in jaws, the ends pressed together and current applied until the welding temperature is reached. The flash welder is a variation of the butt welder in that the two pieces of material to be welded are held apart so that an arc will pass between them as the welding current is applied. This arc (flash) prepares the ends of the material for welding and at this instant the pieces are quickly forced together resulting in the uniting of the two materials.

RESISTANCE welding has become one of the most important of fabricating tools. Herein, the various types of resistance welding methods are described in detail, and attention is given to the machines used and the operating variables encountered. Detailed welding data are also presented for many different types of metals and alloys.

When selecting a welding machine, the first thing to determine is whether the machine is to be used for an individual task or is to be adaptable for job-shop production. The answer to this one question will dictate the transformer rating, the arm length and spacing, the type of electrodes, the pressure closing device, and the method of current timing. The transformer must have sufficient capacity to accomplish the work at hand, and if a variety of tasks are to be performed the transformer should be supplied with taps and a convenient means of tap changing. Arms must have sufficient length and spacing, be adjustable and capable of withstanding the pressures necessary to accomplish the welding operations.

The pressure applying device should be positive and easily adjusted. The pressure may be secured by springs, a cam, or air cylinder. The cam or spring type is recommended for small machines and light work, while the air-operated press-type machine is essential for heavy spot and projection welding. The latter has a wider range of pressure adjustment and is more easily regulated and controlled.

The timing may be manual, mechanical or electrical. In the past, manual timing has been most universal and appeared to be satisfactory for the class of welding then performed, but the appearance, quality and strength of the weld were dependent upon the operator's skill, as the current passed through the work as long as the operator held his foot upon the control switch. This method will produce fair results when welding mild steel to mild steel but when non-ferrous alloys are

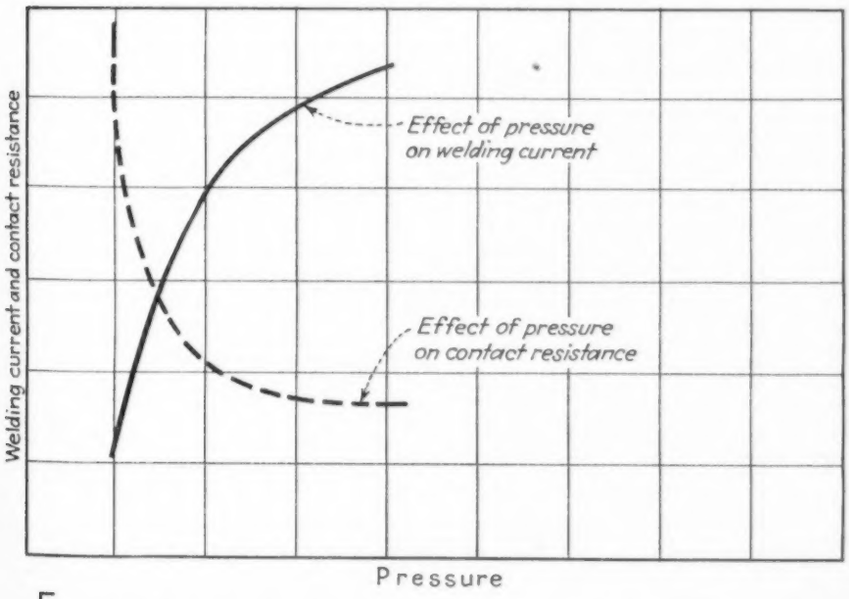

Welding current and contact resistance
Effect of pressure on welding current
Effect of pressure on contact resistance
Pressure

FIG. 3—Effect of pressure on contact resistance and welding current.

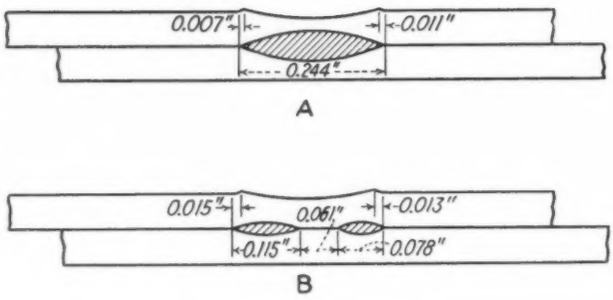


FIG. 4—Representative spot weld cross-sections. (A) 0.063-in. mild steel sheet, first weld, using top electrode of 5/8-in. ball point and bottom electrode of 1 1/2-in. flat face. (B) Cross section with adjacent second weld.

development of metal furniture, the steel autobody, the steel house, lightweight trains, metal toys and many light manufactured articles, particularly in the electrical industry.

It is difficult to determine the strength of a spot weld because of the many variables that affect it. The most reliable method is a destructive test of the welded product. But this is an expensive method and oftentimes not permissible, as each piece welded is required for production.

Many manufacturers supply test plates of material identical to that being welded and require weld specimens to be made prior to starting each job and at prescribed intervals throughout the run. These specimens may be made by lapping the sheets and welding in two spots approximately 2 in. apart, then forcing a cold chisel between them, at the same time observing the difficulty of destroying the welds and whether the weld breaks near the welded surface or pulls a button from the plate. Test specimens welded similar to the work being performed will give comparable results, but if the work is made of magnetic materials and a large portion extends between the arms of the welder, a small test specimen will give a false comparison.

The strength of a weld may be accurately determined by joining plates and machining tensile specimens from the plate. It will be found that the first spot will be stronger than a second or third adjacent spot if the intervening space is such that a portion of the current will shunt through the first spot, so discretion must be used in selecting the spot for the tensile test.

to be welded, or if production requirements demand rapid high-quality welding, the manual timer must give way to something more accurate.

Several mechanical and electronic timers have been developed, and they perform satisfactorily in the majority of welding applications. Such timers are far superior to manual control and have had an important role in advancing the resistance welding art. The ignitron timer is rapidly becoming a widely used method of control. By an arrangement of electronic and ignitron tubes, the welding time may be quickly adjusted from 1 to 25 cycles and the power varied from maximum to 20 per cent by merely turning a "heat control dial." An equivalent heat input is attained in each weld, as the flow of current is accurately measured in cycles and always begins at the zero point of the wave.

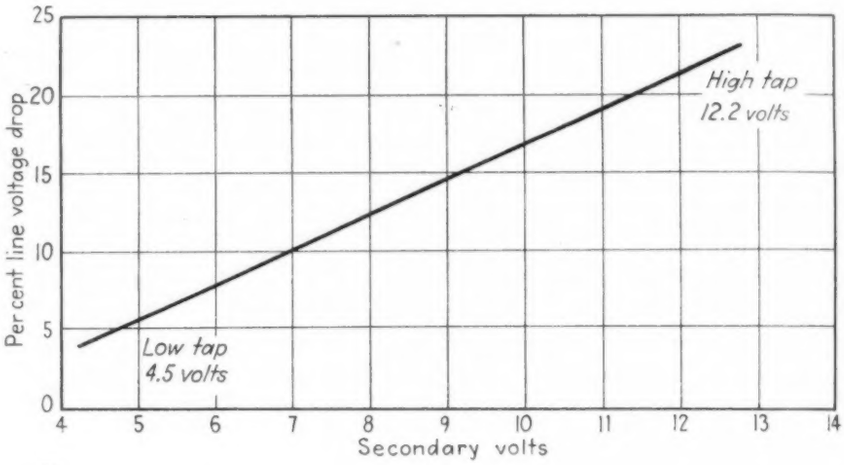


FIG. 5—Per cent line voltage drop with various secondary slots.

Spot Welding

Resistance spot welding is rapidly gaining favor in the fabrication of light-gage materials. Almost always it is more economical than riveting, is as efficient, and the appearance of the finished product is superior. Resistance welding has made possible the rapid

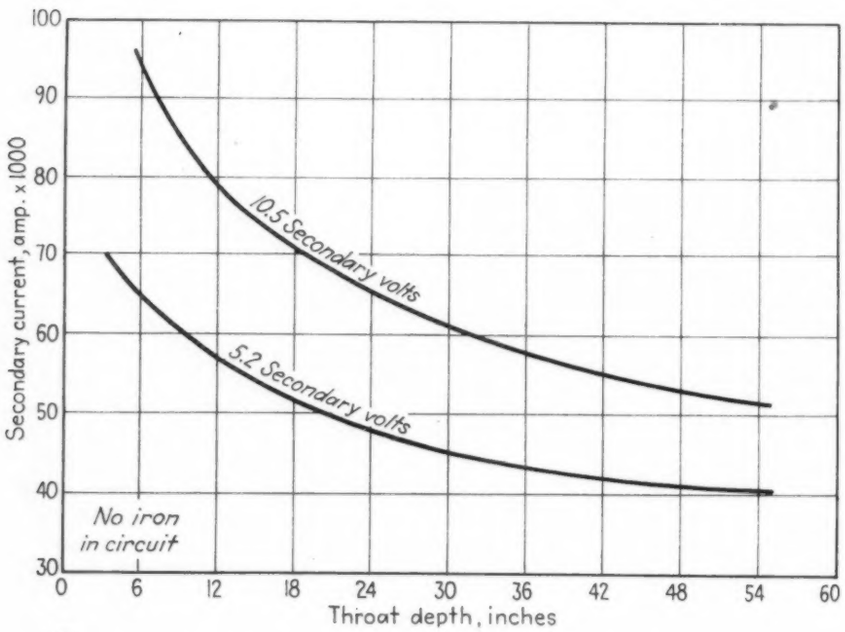


FIG. 6—Variation of secondary current with throat depth.

Fig. 4 shows the cross-section of two welds joining two sheets of 0.063-in. cold rolled steel made with the same machine setting, but with A the first weld and B the second weld. The surfaces of the sheet appeared to be similar, with no indentation on one sheet and with slight discoloration.

Appearance of the sheet at the point of the weld is not indicative of the weld strength, nor is a shower of sparks from between the sheets. The latter usually results in a cavity at the center of the weld, thus decreasing the size and strength of the spot. Each resistance welder should be calibrated prior to being used in production in order that the operator can intelligently adjust the machine settings to compensate for electrical variations. The operator should know the pressure exerted by the electrodes upon the work and the approximate current output of each heat tap of the welding transformer. The pressure can be easily measured with a gage in the air line if the machine is air operated or by closing the electrodes upon a specially designed diaphragm whose deflection is recorded on a pressure gage.

Current output depends not only upon the turn ratio of the transformer and the heat-tap upon which the welder is operating but upon the stability of the power supply, the arm spacing and the arm length.

The welding machine will draw large currents for short intervals, resulting in dangerous line-voltage drops if not properly installed. Welders of 25 kva. capacity and larger should be installed adjacent to a step-down power transformer whose primary is connected to a high-voltage supply.

It is common to experience a 20 per cent voltage drop in the supply line. Fig. 5 shows a voltage drop of 4.5 to 21 per cent for a 200-kva. spot welder whose primary is supplied 230 volts from a 2300-volt transformer through 150 ft. of 500,000 circular-mil cable.

When the throat depth or opening is varied or a magnetic material is placed between the arms of the welder, the reactance of the welding circuit is changed, resulting in a current output other than that calculated from the turn ratio with average conditions prevailing.

The Federal Machine & Welder Co. has calibrated a 350-kva. welder to determine the effect of the throat depth and opening, and the results show that as the arm length is increased or the throat opening is increased, the current output will decrease as shown in Figs. 6 and 7. A magnetic material such as iron within the throat opening will decrease the output of the machine in direct proportion to the amount of material in the circuit (see Fig. 8). Because of this, a small test specimen, the major portion of which is outside the magnetic circuit, will not be comparable to a work piece—the majority of which extends in the throat opening.

The welding electrodes play an important part in spot welding. The size, shape, and material are variables that must be considered when selecting the proper tip for a given job. For a given machine setting, the smaller the tip area the greater the current concentration at the spot to be welded. A ball-pointed electrode will produce a higher local pressure and current concentration than a flat-faced electrode, usually resulting in an equivalent weld with from 10 to 15 per cent less power. The work will be badly indented from the ball-pointed electrode and some engineers maintain that an electrode of this type will insure uniform strong welds in production while a flat faced electrode will give erratic welds. This is not entirely true, as with uniform timing and proper heat and pressure settings identical welds will be made with flat faced electrodes throughout a production run. The appearance of the weld will be superior and the electrode life will be greatly increased. The electrode diameter should be governed by the thickness of the material welded.

Electrode material should possess high electrical conductivity and resist deformation under pressure. Copper has been extensively used as an electrode material because of its high electrical conductivity, but it is relatively soft and quickly deforms, and therefore requires frequent replacing. Several copper alloys, such as Cupaloy, have been developed for electrode material and are giving excellent results. These alloys have approximately 85 per cent the electrical conductivity of copper and the hardness is of the order of 80 Rockwell B. A Cupaloy electrode will produce from 2000 to 3000 spots with an increased tip area of 50 per cent while a copper electrode will show an increased tip area of 50 per cent after producing from 200 to 300 spots and an increased tip area of 225 per cent after producing 1000 spots.

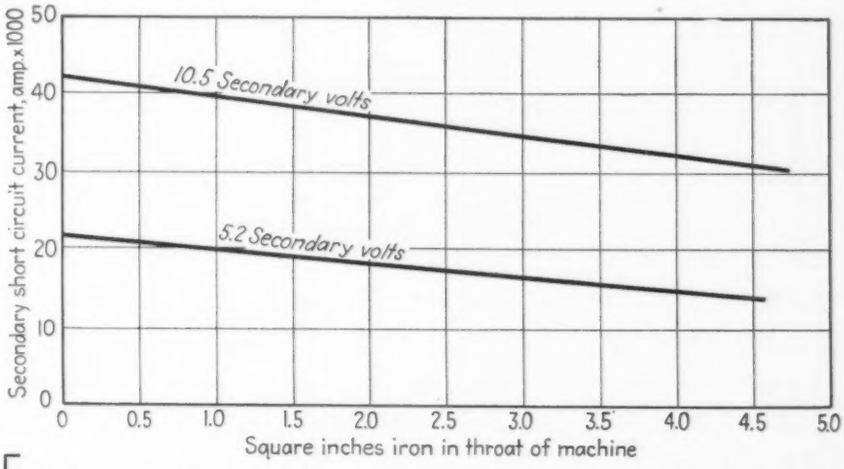


FIG. 7—Variation of secondary amperes with square inches of iron in throat.

These age-hardening copper alloy tips are very desirable when welding steel, brass, or aluminum, and will give satisfactory results with silver and silver alloys. But when a low resistance material has to be welded to a high-resistance material (silver to steel, for instance) it is advantageous to use an electrode of low conductivity against the low-resistance material so that it will not stick to the material and will conduct heat to the area to be welded. There are special alloys that will accomplish this task, or the use of tungsten or molybdenum inserts is frequently advantageous.

The operator cannot determine the machine setting for a new job by the use of a formula. He must arrive at a machine setting by trial and error and from past experience obtained from similar work. He must choose a suitable electrode, the probable heat tap, the approximate welding time and a desirable working pressure. A spot is made and tested for strength. Should it be of insufficient strength, the time or power or both may be increased or the pressure decreased. Various adjustments are made until the desired

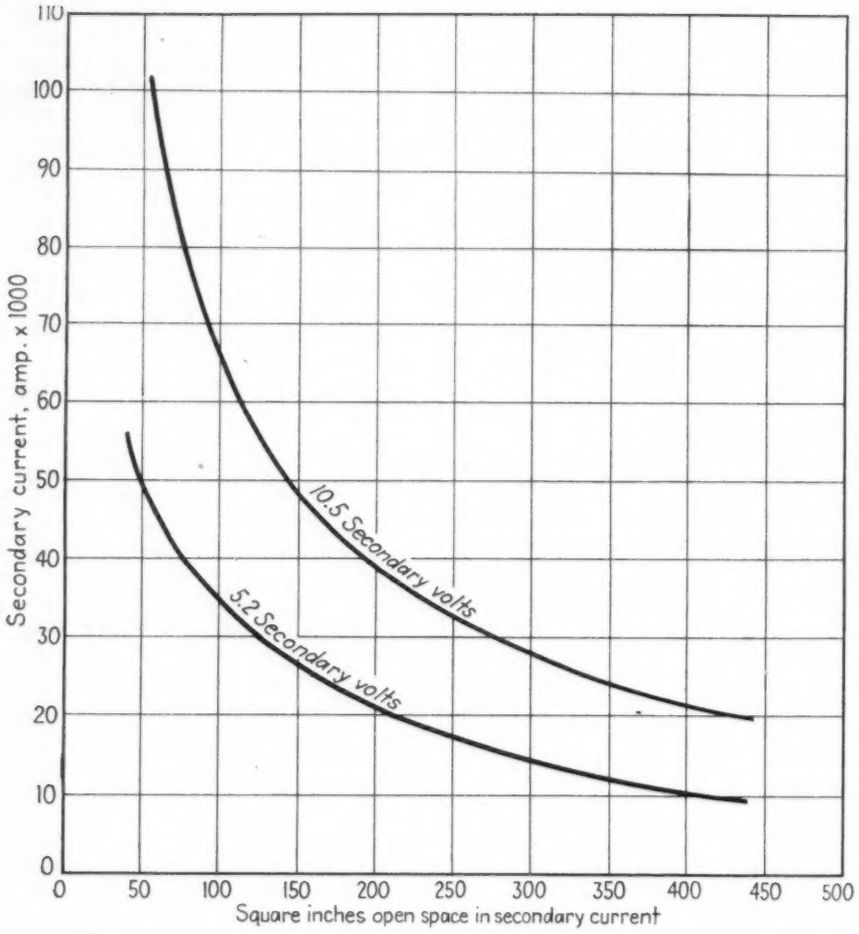


FIG. 8—Variation of secondary current with throat opening.

weld is secured. The increase of one cycle in the welding time is equivalent to a 5 or 10 per cent power increase or a decrease of 150 lb. in the electrode pressure. More than one setting may produce equivalent welds but two of the variables involved must differ from those in any other combination.

The characteristics of the metals to be welded influence the determination of proper machine setting. Steels, which have a wide plastic range, will accommodate a wide variation in welding time, while aluminum and copper alloys demand short, accurate welding times. The melting point of some of the common metals is shown in Table I.

The relative electrical resistivity of a material will aid in determining the power necessary to make a weld. The greater the resistance of the material the lower the current necessary, and in Table II it may be seen that silver requires a maximum of power while stainless steel takes a minimum.

An operator can approximate a machine setting from data compiled by others, but it is necessary to allow for variations because of the many factors that affect the welding cycle.

Mild steel is readily welded and has very desirable welding characteristics because time, power, and pressure settings may be varied somewhat. Ball-pointed electrodes produce satisfactory welds but if appearance is important, a flat-faced electrode is recommended for at least one side. Cold rolled steel is satisfactorily welded but hotrolled steel has better welding properties. When hot rolled sheet is used the mill scale should be removed by pickling, shot-blasting or grinding. The scale has a high resistance and will cause pitting of the electrode by arcing. The surface of the sheet should be free of oil and dirt.

When welding mild steel without ignitron timing the data in Table III may be used to determine an approximate setting. Ignitron timing requires sufficient power to make a weld in a few cycles. Data obtained, using a 200-kva. welder with a ball-pointed electrode against one sheet and a large flat tip against the other sheet to give the best possible appearance, are shown in Table IV.

Aluminum must reach the melting point during the welding process. This characteristic necessitates accurate short-cycle control. The machine must have a high current rating, as aluminum requires five times more power than mild steel, and it is preferable that it close upon the work without a hammer blow. One electrode should be ball or core-pointed and the other flat-faced. It is advisable to remove the oxide from the surfaces of the sheet adjacent to the electrodes with

TABLE I

Melting Point of Metals

Metal	Melting Point, Deg. F.	Metal	Melting Point, Deg. F.
Tin	450	Copper	1981
Lead	621	Manganese	2300
Zinc	787	Nickel	2646
Antimony	1166	Chromium	2768
Magnesium	1204	Steel	2786
Aluminum	1218	Platinum	3191
Silver	1761	Molybdenum	4500
Gold	1945	Tungsten	5400

TABLE II

Electrical Resistance of Metals with Respect to Copper

Material	Resistance Factor	Material	Resistance Factor
Silver	0.95	Zinc	3.50
Copper	1.00	Nickel	4.50
Gold	1.40	Platinum	5.80
Aluminum	1.60	Steel	5.80
Chromium	1.60	Tin	6.70
Magnesium	2.70	Lead	12.80
Manganese	2.90	Antimony	24.20
Tungsten	3.20	Stainless Steel	35.00

TABLE III

Welding of Mild Steel with Ignitron Timing

Gage Thickness, Each Plate	Time, Sec.	Pressure, Lb.
24	0.4	150
22	0.5	200
20	0.6	250
18	0.7	300
16	0.8	350
14	0.9	500
12	1.0	750
1/8	1.2	900
3/16	2.5	1200

emery paper to prevent the aluminum from sticking to the electrodes.

The Aluminum Co. of America recommends the spot welding data shown in Table V.

Brass requires a short welding time with a moderate pressure but with four times more power than mild steel. A ball-pointed tip will produce a weld with less power than a flat faced electrode, but the machine setting must be accurately adjusted to avoid a hole at the center of the weld from the loss of zinc. Two flat-faced electrodes will give very good results with good surface appearance. Pin holes in the center of the welds are not so common but require considerably more power. Data for brass are shown in Table VI.

Stainless steel (18-8) is an austenitic non-magnetic steel with a very short plastic range and high electrical resistance. It has the property of losing its stainless qualities when heated above 500 deg. C. (932 deg. F.) for short intervals of time as the result of carbide precipitation along the grain boundaries. Exceptionally good welds can be secured with welding times of one or two cycles, using flat-faced electrodes and welding pressures considerably higher than those necessary for mild steel. Welding data are shown in Table VII.

H. Thomasson has made an extensive study of the spot welding of special alloys and has compiled the data shown in Table VIII. These data should aid the welding operator in selecting a desirable machine setting for most any welding task, but the operator must use his own ingenuity when the occasion demands. Projections or inserts of high-resistance material between the parts to be welded often aid in securing a satisfactory weld. The projections are usually pushed from the opposite side of the sheet and may be spherical, flat, elongated, or an annular ring. They should be on the heavier plate to be welded, have a diameter approximately equal to the plate thickness, and project above the plate a distance equal to from 40 to 60 per cent of the plate thickness. The raised annular ring around a deep center punch mark or a point raised along the edge of the plate by upsetting with a punch will often give a satisfactory projection.

Resistance welding is still not an exact science. In spite of its many variables, however, the ingenuity of the machine builders, the accessory manufacturers and the welding operators has so advanced the process that it has replaced riveting and also improved the art of metal fabrication.

TABLE IV

Mild Steel, 200-Kva. Welder, One Ball-Pointed Electrode and One Flat Tip

Thickness Each Plate	Time, Cycles*	Secondary Volts	Weld Current, Amp.	Pressure, Lb.
0.038	1-2	4.8	11,000	500- 600
0.063	2-3	5.2	12,000	600- 750
0.078	3-4	5.7	13,500	750- 900
0.094	5-6	6.1	15,000	900-1150
0.125	7-8	9.1	24,000	1200-1500

* Based on 60 cycles per sec.

TABLE V

Spot Welding Data for Aluminum

Thickness Each Sheet	Time* Cycles	Weld Current, Amp.	Electrode Pressure, Lb.
0.020	1	15,000	200- 300
0.032	1- 2	17,000	300- 400
0.051	2- 3	19,000	400- 500
0.064	3- 4	22,000	450- 600
0.081	5- 6	26,000	550- 700
0.101	6- 7	30,000	600- 900
0.125	8-10	35,000	800-1400

* Based on 60 cycles per sec.

TABLE VI

Welding Data for Brass

Thickness Each Plate	Time, Cycles	Current, Amp.	Pressure, Lb.
0.032	2-3	14,000	450
0.063	4-6	16,000	600

TABLE VII

Welding Data for Stainless Steel

Thickness, Each Plate	Weld Time, Cycles	Weld Current, Amp.	Pressure, Lb.
0.032	1	13,000	800-1000
0.063	2	14,000	800-1000
0.125	4	15,000	900-1200

TABLE VIII

Welding Data for Special Alloys

Material	To Material	Time, Cycles	Power Kva.	Pressure Lb.
0.020 sheet lead	0.020 sheet lead	1	7	125
0.063 sheet lead	0.063 sheet lead	1	18	200
0.125 sheet zinc	0.125 sheet zinc	5	80	300
0.032 Ni-silver	0.032 Ni-silver	2	18	400
No. 26 gage galv. iron	No. 26 gage galv. iron	2	57	450
No. 20 gage galv. iron	No. 20 gage galv. iron	2	62	600
0.093 tinned Everdur	0.093 tinned Everdur	5	57	500
0.050 brass	0.050 Olympic bronze	4	57	450
0.063 brass	0.063 Olympic bronze	4	63	500
0.050 brass	0.032 Ni-silver	3	57	450
0.050 Olympic bronze	0.032 stainless 18-8	2	18	550
0.050 Olympic bronze	No. 20 gage galv. iron	4	67	500
0.050 Olympic bronze	0.050 mild steel	2	32	470
No. 20 gage galv. iron	0.040 mild steel	3	13	400
No. 26 gage galv. iron	0.032 stainless 18-8	2	31	550
0 040 mild steel	0.032 stainless 18-8	2	13	550
0.060 magnesium alloy	0.060 magnesium alloy	2	84	600
320 x 0.002 copper shunt	mild steel	2	45	500
504 x 0.002 copper shunt	mild steel	4	60	500
504 x 0.002 copper shunt	stainless 18-8	2	83	500
504 x 0.002 copper shunt	brass	6	360	500
504 x 0.002 copper shunt	aluminum	8	190	500
0.032 brass	0.038 steel	3	84	500
0.063 brass	0.063 steel	6	125	600
Galvanized screen	mild steel	2	60	450

PORCELAIN ENAMELED

THE tremendous increase in the production of porcelain enamels during the past 25 years has been due in a very large measure to the use of enamel as a finish for articles to be used in the home. During this time there has been developed the porcelain enameled stove, refrigerator, washing machine and, more recently, the porcelain enameled medicine cabinet. The present trends indicate that soon another large new market for enamel may be developed through the increased use of architectural porcelain enamel in the home.

However, one important appliance present in every modern home, which probably receives less attention and causes more annoyance to the householder than any other object of everyday home use and which has to date been largely neglected in the trend toward use of porcelain enamel, is the hot water storage tank. The use of circulating hot water in the modern home has long since ceased to be a luxury. However, the domestic hot water tank in use today is no better than it was many years ago and still gives rise to untold annoyance, not to mention considerable expense due to untimely failure. Herein lies an almost untapped field for porcelain enamels and a field in which the enameler may readily be of great service to the American householder.

Domestic hot water tank failures are in general due to two major causes. First, the tank may rust through due to failure of the galvanized lining. Again, it may fail to produce an adequate supply of hot water or may be grossly inefficient due to a deposition of insoluble minerals from the water on the surface of the tank.

The domestic hot water tank in most general use consists of a cylindrical steel shell of about 30 gal. capacity protected from rusting by galvanizing. The zinc coating may completely cover the tank when installed, but after some years the coating may pit and break down, allowing the water to attack the iron with subsequent failure of the tank. Of course, water tank life varies depending upon the nature of the water supplied. Thus, in areas where waters of abnormal oxygen content, alkalinity or acidity are encountered, the tank life may be relatively short. The galvanized coatings are attacked by water under the conditions of temperature and pressure encountered in home service. The higher the temperature and pressure, the more rapid will be the breakdown of the tank. Another factor which may well play a part in water tank failures is electrolysis, resulting from the many types of electrical appliances and circuits that are grounded on the water lines.

The householder living in areas where water tank life is exceptionally short has often turned to a copper or a Monel water tank. These tanks are expensive, however.

About five years ago the Fowler Co., Portland, Ore., faced with a heavy replacement problem for water tanks in certain Western areas, began to experiment with the use of porcelain enamel as a tank lining. These tanks showed a great improvement, even though the enamels used thereon were ordinary commercial enamels not especially designed for the service in question. As a result of its experiments on the enameling of hot water tanks, the Fowler Co. obtained U. S. Patent No. 2,123,169 covering new and novel procedures developed by them. At about the same time certain concerns manufacturing water meters in Eastern areas turned to porcelain enamel.

More recently other manufacturers of water tanks have become interested in the manufacture of enameled tanks, and the testing procedure reported by Spencer-Strong and Stufft* have been modified to produce an accelerated simulated service test, making possible the accurate determination of the effect of hot water tank service upon porcelain enamel.

As a result of these tests, special enamels have been developed for hot water tank use far superior to the regular commercial enamels in this service. Tests show that a water tank properly enameled with porcelain enamel designed for the purpose should have a very high life expectancy. From a theoretical standpoint the life expectancy of hot water tank enamels should be superior, since these enamels are not affected by alkalinity or acidity of water, nor are they destroyed by high oxygen content. Furthermore, porcelain enamel, being a non-conductor, is not affected by electrolysis.

The cost of a Monel metal hot water tank of 30 gal. capacity is roughly four times that of the best grade galvanized tank and almost five times the cost of the standard galvanized tank which is usually used in homes today. The cost of the copper tank is only slightly less than that of the Monel. While the extra operations involved in enameling may increase the cost of the enameled tank above that of the galvanized, the difference in cost is nowhere near that of the Monel; in fact it would appear possible to porcelain enamel a water tank in a properly equipped plant at a cost of less than 50 per cent greater than that of the galvanized tank.

One of the major difficulties that has been encountered up to the present time by many people attempting to

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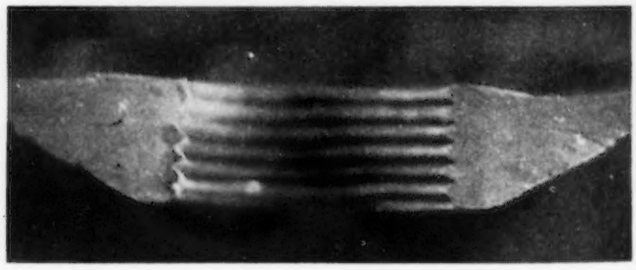

FIG. 1—Section through a typical nipple weld in the head of a water tank.

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*"Behavior of Enamels in Contact with Liquids at High Temperatures and Pressures," by G. H. Spencer-Strong and P. C. Stufft, Bulletin of American Ceramic Society, 17, (4), pp. 170-174, 1938.

WATER TANKS...

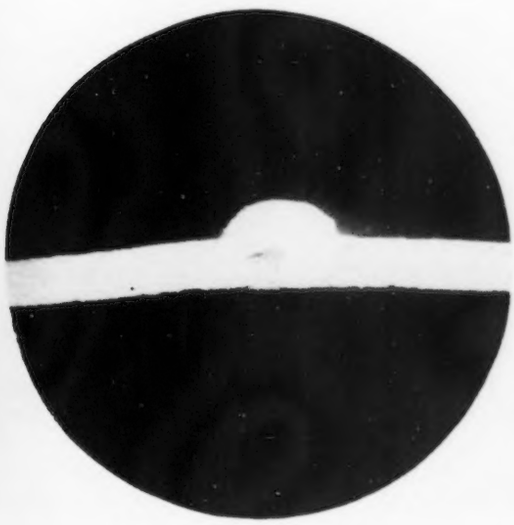
Performance, Costs, Design, Fabrication, Inspection, Etc.

By Dr. GEORGE H. SPENCER-STRONG
Porcelain Enamel & Mfg. Co., Baltimore

enamel hot water tanks is the fact that they have endeavored to enamel a tank of ordinary galvanized tank design fabricated in enameling iron. It is well known that in order to get the best results from any enameling job it is necessary that the product be designed for the finish. Galvanized tank designs usually consist of the fabrication of a steel cylinder by butt joint and arc welding the two sides of a steel shell, inserting the heads with fairly long flanges and welding same to the cylinder. Outlet nipples are provided by inserting a nipple in the shell of the tank and welding the nipple in place. *This design is very unfavorable for porcelain enamel.* Since heavy gage metals must be used in the tanks, areas of extremely heavy metal are encountered at the ends of the tank where the heads are located and around the nipples where heavy masses of welded metals are built up to strengthen the nipple. As a result, the heavy areas may be underfired while the body of the tank is overfired, resulting in a poor enameling job. Further, the projection of the nipples into the heads of the tank makes it very difficult to drain the excess enamel from the heads, giving rise to wide variations in enamel thickness.

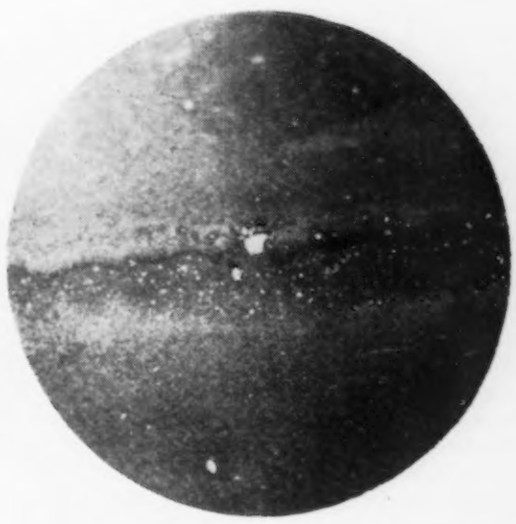
Fig. 1 shows a section through a typical nipple weld in the head of a water tank. The thin area of metal at the right side of the photograph shows the thickness of the metal in the head proper. Note the heavy build-up of welded material around the nipple. Note also how the inner face of the nipple protrudes above the bottom of the head surface, making draining difficult. Note also the open weld on the left side of the picture which may be expected to give rise to blistering and other enameling defects. The production of hot water tanks for galvanizing does not entail any special care in the welding operation. However, when the tank is to be porcelain enameled welding must be carried out with great care since the heavy mass of iron introduced by the operation may be spongy and contain oxide and slag inclusions, giving rise to blisters and copperheads during the enameling operation.

Fig. 2 and Fig. 3 show the results of such improper welding practice in



AT LEFT

FIG. 2—Section through an improper weld along the side of a water tank.



AT RIGHT

FIG. 3—Defects in the porcelain enamel on the inner surface of the water tank under the improper weld shown in Fig 2.

the butt weld along the side of a water tank. Fig. 2 shows a section through the weld. Note the spongy oxidized area in the center of the weld with an open crack leading to the surface of the metal. Note also the large mass of welding material on the outer side of the shell almost doubling the thickness of the iron at this particular spot.

Fig. 3 shows defects in the porcelain enamel on the inner surface of the water tank under the improper weld shown in Fig. 2. Note the heavy blistering condition over the weld, especially along the black line which indicates the position of the open seam shown in Fig. 2. The use of the lap welded heads introduces several sources for defects. There are two methods which have been used in attempts to produce tanks of this design. In the first method the heads and the shell are ground-coated prior to welding in the head. This necessitates the grinding of an area of the head flange and the inner edge of the shell to facilitate the welding procedure. After the heads have been welded on, the final applications of enamel are made. Unfortunately, the lap weld not only produces a double metal thickness over the flanged area, but it also may leave a crack between the head and the shell into which enamel cannot be forced.

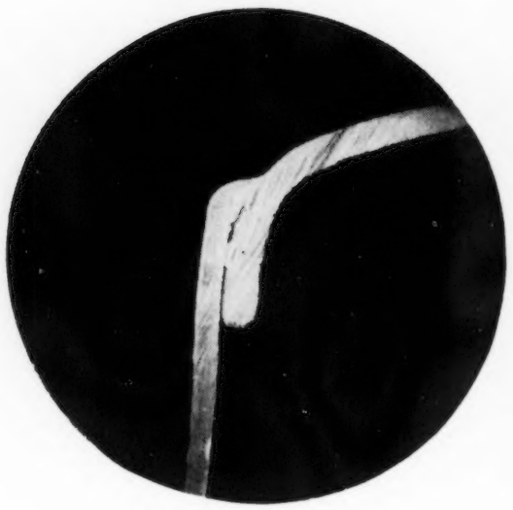
Fig. 4 shows a section through such a weld. Note that the weld joins the head and the shell only at the outer edge of the shell, leaving an open area between the remainder of the head flange and the shell into which the enamel cannot penetrate. The use of this method of fabrication also entails the necessity that the edge of the flange within the tank have a smooth and rounded surface.

Fig. 5 shows results of attempts to enamel such a flange where this condition did not prevail. The photograph is taken looking down on the flange along the side wall of the tank which is located at the upper edge of the picture. Note the opening between the shell and the flange. The rough area just below the opening is a highly oxidized enameled area due to an extremely rough surface on the edge of the flange. Below this is an area of burned off metal due to the sharp edge of the inside of the flange. Had the edge of this flange been rounded and smooth of surface the enamel might have had a better chance of penetrating between the flange and the shell, thus closing the gap now existing, and the burned off area due to the sharp edge and the rough surface could have been avoided.

o o o

FIG. 4—A lap welded head not only produces a double metal thickness over the flanged area, but it also may leave a crack between the head and the shell into which the enamel cannot be forced.

o o o



In order to secure a satisfactory enameling job, it becomes necessary to redesign the tanks in part to eliminate the bad features of prior design. Great care should be exercised in welding the nipples to the tank. It has been suggested that in the case of the heads it may be possible to countersink the nipple opening so as to allow the enamel to drain properly from the tank and at the same time build up sufficient metal to properly hold the nipple in place. This procedure should also eliminate many of the other welding defects encountered about the nipples since the weld need not be as heavy in the previous designs and could be largely restricted to the outer surface of the tank.

By change in design incorporating a butt weld between the head and shell of the tank in place of the lap weld previously used, the open space between the head and the shell, as well as the variation in metal thickness previously encountered, may be eliminated. One design has been suggested in which a single welded head is employed, the other head being attached to the tank by bolts. With this design a superior enameling job can be assured since application problems are reduced and a closer inspection after enameling is possible. With such a design great success may be expected in the covering of faulty areas of enameling on defective pieces. The open end tanks offer a possible solution for the second major cause of water tank failure; that is, the deposition of insoluble minerals on the interior surface of the tank. Porcelain enamel being a glass offers a smooth surface, thus reducing the ease of deposition of crusts of insoluble material. Furthermore, by using an open head tank it should be possible to remove the insoluble material periodically, thus retaining the efficiency of the tank. Experience in the manufacture of enameled water tanks will undoubtedly suggest many further innovations in fabrication and design, simplifying and improving the enameled tanks.

Enamels to be used for coating hot water tanks must be selected with care. Ground coats with fairly wide burning range and with a minimum tendency to copperhead or reboil are desirable. The finish coat should consist of an enamel especially designed for that use, although ordinary enamels may be expected to give fairly satisfactory service with most waters. However, they are more soluble and more readily attacked by slightly acid or alkaline waters. Enamels are now available which are designed to show a maximum resistance to bad water conditions and these enamels should be used. Enamels should be wet milled to a fineness of 6 to 8 gm. on 200 mesh, and both ground coat and cover coat should be very carefully rotosprayed and run through a magnetic separator to assure removal of tramp iron, coarse frit particles and other undesirable materials, since the entire coating of the tanks must be absolutely perfect and no breaks in the surface whatever can be allowed.

The enameling of hot water tanks gives rise to shop problems which are somewhat different from those encountered in everyday practice. To begin with, the tanks are large, heavy and rather clumsy to handle. The enameling procedure will largely depend upon the tank design. With butt welded heads the tank should be assembled before pickling. With lap welded heads it

may be desirable to enamel the various parts of the tank in ground coat before assembly. If the tank is completely closed, this may give a more satisfactory job since it makes possible the proper cleaning of the metal prior to enameling and simplifies inspection. On the other hand, it is necessary to remove by grinding some of the enamel coating prior to the enameling operation, and it is difficult to clean welds after one coating of enamel has been applied.

Enamel may be applied to either the interior of the tank alone or to both sides, depending upon the final use. Thus, if electrical coil heaters around the outside of the tank are to be used, it is not advisable to enamel both sides. On the other hand, if the tank is to stand in the kitchen or some other readily visible spot, it may be desirable to give the outside of the tank a decorative finish coat. The enamel is applied to the inside of the tank by a modified dipping operation in which a quantity of enamel is poured into the tank and the tank rotated to get a uniform coating throughout.

For production practice the use of a rotatable jig or frame upon which the tank is clamped will be desirable since it will reduce both labor and damage due to mishandling. With completely closed tanks special drying arrangements are desirable, including the introduction of a blast of heated air through one of the nipple openings through the bottom of the tank. Drying should be carried on slowly and at a low temperature initially in order to avoid runs on the tank walls. During the later stages drying may be carried on as rapidly as possible, but unless air is introduced into the tank satisfactory results will not be obtained. For greatest economy, special firing equipment is desirable. If the tanks are fired in the horizontal position the load will be reduced in many cases below an economical limit; whereas if equipment is available to make possible firing of tanks in a vertical position, more tanks may be fired to a load and the cost reduced. Undoubtedly, a specially designed continuous furnace should give optimum results both in efficiency and satisfaction from the standpoint of the finished ware.

Due to the size and shape of the tanks, the use of special enameling equipment and conveyors should greatly reduce labor cost as well as loss due to handling. In order to guarantee satisfactory results at least two coatings of enamel should be employed; that is, the combination of a ground coat and either one heavy application of finish coat or two lighter applications of finish coat.

Due to the service to which the tanks are put, enameled hot water tanks should receive especially careful inspection following all phases of the manufacturing process. It follows that careful inspection after the fabrication, pickling and ground coating operations will reduce rejects in finish coat. The finished tanks may be inspected either by inserting a small electric light into the tank and carefully examining the entire surface, or by running an electrode over the entire surface, the other contact of which has been grounded on the metal of the tank. Should the electrode encounter a bare surface in the enameling iron, a light or other signaling device will be operated. By using increased voltages, it is possible to use this method not only to determine bare spots in the interior of the tank, but also to detect areas where the enamel is thinner than desirable.

As has been stated, a rather simple accelerated simulated service test has been devised which makes it possible to test enamel tank materials under conditions very similar to those encountered in actual service. The testing equipment consists of a cylindrical tank with a removable head equipped with a thermostatically controlled heating burner, a circulating water pump and the necessary equipment to introduce compressed air into the tank. Since experience has shown that water tank deterioration is in direct ratio to the temperature and pressure employed, the device is operated at a temperature of 210 to 220 deg. F. at a pressure of 80 lb. per sq. in. Since most home units are operated at a temperature of 140 to 150 deg. F. and a pressure of 40 lb. per sq. in., the above conditions are far more severe than those normally encountered. The pressure is obtained by introducing compressed air through a tube in the bottom of the tank. This method of introduction serves a double purpose, since not only is the desired pressure obtained but the compressed air must bubble through the water in the tank as it is introduced, thus aerating it and helping to produce the third major cause of water tank failures; that is, aerated water.

The samples used are cylindrical tubes approximately 1 in. in diameter and 2½ in. long, which have been coated with the material under test. These are suspended vertically in the water during the operation of the test. At the same time the circulating pump is put into operation. This pump removes water from the tank at the bottom thereof, reintroducing it above the water line at the top, thus further aiding in the aeration of the water. Since the pump has a capacity of approximately 5 gal. per min. and the tank a capacity of 15 gal., the water in the tank is completely circulated every 3 min., thus producing a circulating action far more severe than is encountered in normal water tank operation. It is also possible, if desired, to use waters of a composition simulating those found in service. Specially designed water tank enamels have never been broken down, although tested for more than 2500 hr., whereas some galvanized coatings have been broken down in 50 hr. This test would appear to simulate every service condition encountered in practice with the exception of electrolysis and pressure pulsation. Testing equipment is available by which the effect of pulsations may be determined.

It is indicated that the domestic hot water tank presents a new field of service for porcelain enamel. The new field not only presents attractive possibilities for the enamel, but apparently for the industry, to be of great benefit to the American household. In entering the new field, great care should be taken that suitable enamels are used and that the design of the water tanks produced are compatible with the operation in order that the best results may be obtained.

FIG. 5—Had the edge of this flange been rounded and smooth of surface the enamel might have had a better chance of penetrating between the flange and the shell, thus closing the gap now existing.

By GAYLORD G. THOMPSON
Madison, Wis.

CARBIDE

Control and Use

MUCH has been written about results to be expected from the use of carbide tools, together with generalities of what has been accomplished by them. It is certainly mighty pleasing to read reports of cost reductions as affected by carbide tools and tooling methods—however, what has happened in the shop to bring about this cost reduction?

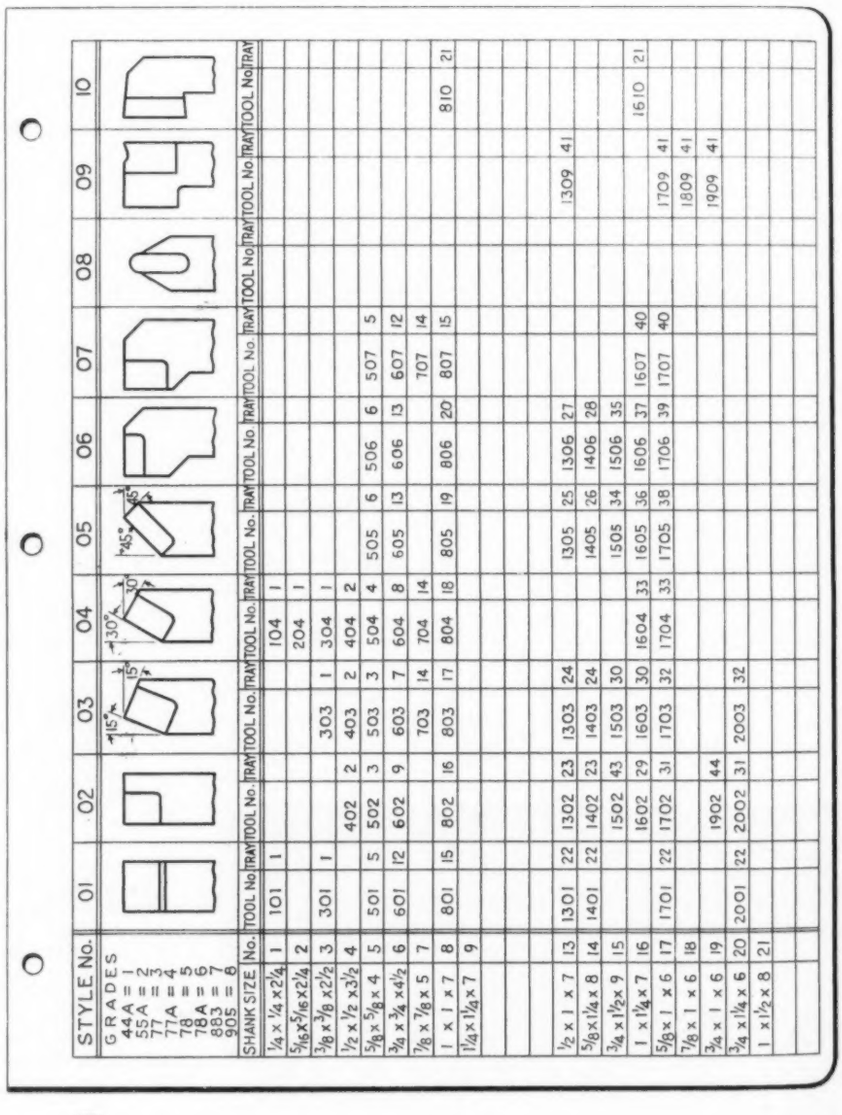
How many different kinds of tools are required? How are the tools controlled in order to offset the higher cost of each tool? How can the tools be used economically on small-lot orders that repeat only once or twice a year? How can the cost of tool depreciation or destruction by inexperienced workers be held down? These are some of the questions that would come to the mind of any factory executive who is considering the adoption of carbide tools.

This article is a compilation of true facts involving the introduction of carbide tools and methods in a manufacturing plant.

There is no doubt that carbide tools are taking the "back-gears" out of production. Everything must run open-belt—higher speed—to get the full benefit of the cut-feet capacities of carbide tools. Machine tools that were "bears" for production at 60 to 100 cut-feet per min. were miserable flops when stepped up to 300 cut-feet per min. The old reliables of the early days usually did not have the "guts," as one executive remarked when questioned why he was disposing of old machinery.

It is natural, therefore, that drastic changes in the design of machine tools would take place. More power at high speeds is now the demand of customers of machine tool manufacturers. The universal source of this demand is significant. It practically proves that carbide tools in manufacturing industries have been accepted as more economical when *properly controlled.*

When carbide tools are about to be introduced in a manufacturing plant, it has been found very essential to appoint a man whose chief duties would be to supervise the general use of carbide tools. He should be a man who has had abundant experience in tooling of various types of machine tools—one who has an analytical mind so as to detect fertile fields of carbide



STYLE No.	01	02	03	04	05	06	07	08	09	10
GRADES 44A = 1, 55A = 2, 77 = 3, 77A = 4, 78 = 5, 78A = 6, 883 = 7, 905 = 8										
SHANK SIZE	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY	TOOL No. TRAY
¼ x ¼ x 2¼	101 1			104 1						
5/16 x 5/16 x 2¼				204 1						
⅜ x ⅜ x 2½	301 1		303 1	304 1						
½ x ½ x 3½		402 2	403 2	404 2						
⅝ x ⅝ x 4	501 5	502 3	503 3	504 4	505 6	506 6	507 5			
¾ x ¾ x 4½	601 12	602 9	603 7	604 8	605 13	606 13	607 12			
⅞ x ⅞ x 5			703 14	704 14			707 14			
1 x 1 x 7	801 15	802 16	803 17	804 18	805 19	806 20	807 15			810 21
1¼ x 1¼ x 7										
½ x 1 x 7	1301 22	1302 23	1303 24		1305 25	1306 27			1309 41	
⅝ x 1¼ x 8	1401 22	1402 23	1403 24		1405 26	1406 28				
¾ x 1½ x 9		1502 43	1503 30		1505 34	1506 35				
1 x 1¼ x 7		1602 29	1603 30	1604 33	1605 36	1606 37	1607 40			1610 21
⅝ x 1 x 6	1701 22	1702 31	1703 32	1704 33	1705 38	1706 39	1707 40		1709 41	
⅞ x 1 x 6									1809 41	
¾ x 1 x 6		1902 44							1909 41	
¾ x 1¼ x 6	2001 22	2002 31	2003 32							
1 x 1½ x 8										

FIG. 1—Style sheet showing the 10 different tools to be used.

TOOLS . . .

in the Shop

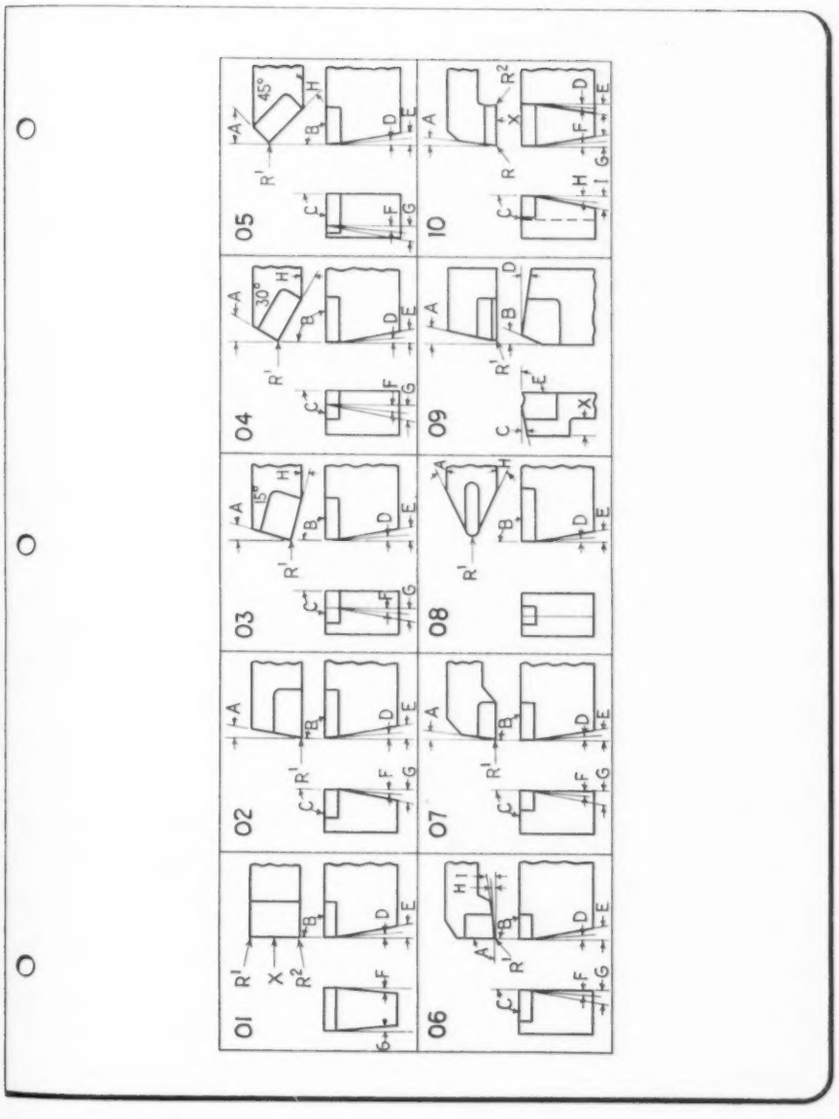


FIG. 2—Grinding sheet for the carbide tools.

tooling applications. He should be devoid of egoism and happily possessed with diplomatic qualities. He'll need the latter quality to overcome the selfish opposition which seems to exist in every plant where new methods are presented.

Next comes the problem of selecting the carbide tool or the manufacturer of a carbide tool that will give the most universal service. It has been found that where one carbide manufacturer's product excelled in cutting steel, it was equally the reverse when it came to machining cast iron. On the other hand, another manufacturer's product excelled in cutting cast iron but did not equal the best performance in cutting steel. However, the tests for cutting steel were made at a cut-feet that exceeded production requirements.

The carbide known as Carboloy was chosen the one to be used exclusively. Exclusively because it permitted greater discounts because of purchases from one source. As this type of carbide is manufactured in a number of different grades, two grades were finally chosen for use in the shop, namely, No. 44A grade for cast iron and No. 78A grade for steel. Some of the jobs in the shop would have done better with some other specific grade, yet as a whole, the two grades simplified records and were satisfactory for general purposes.

The next problem to settle was to determine how many different styles of cutting tools would be required. After a thorough analysis, ten different styles of tools were determined as sufficient from which practically 80 per cent of the shop requirement could be met (see Fig. 1.). Other tools than those listed on this chart would have to be treated as special for their respective jobs. These ten tools, or styles, form the group from which innumerable tool shapes and sizes are made. In other words, these tools are purchased from the manufacturer in only the milled and brazed condition—unground—and are charged to raw stock when received.

The Carboloy Co. stamps its tool number on each tool and this serves as a pattern number in the raw stock records. Oftentimes a number of different tools are made from the same pattern during the grinding process. A new tool number is given with each change in grinding specification. The fundamental principle of this tool control is practically the same as with castings where one pattern or casting provides for a number of similar finished parts but whose difference in

502

NAME Straight Side Turning Tool * Equals Left Hand.

SIZE 5/8 X 5/8 X 4 Shank 1/2 X 3/8 X 5/32 Blank

R^2	X	Y	DEGREES									GRADE	R^1	CATALOG NUMBER		TOOL NUMBER
			A	B	C	D	E	F	G	H	I					
			6	90	96	6	10	6	10			44A	1/32	S4A7MB		C-502-1
			"	"	"	"	"	"	"			"	1/16	"		C-502A-1
			"	"	"	"	"	"	"			"	1/8	"		C-502B-1
			"	"	"	"	"	"	"	Chip Groove		78A	1/64	"		C-502-6
			"	"	"	"	"	"	"	"		"	1/8	"		C-502A-6
			"	"	"	"	"	"	"			44A	1/32	S7B7MB	*	C-502C-1

FIG. 3—Grinding specifications and the assignment of tool numbers are made on this type of form.

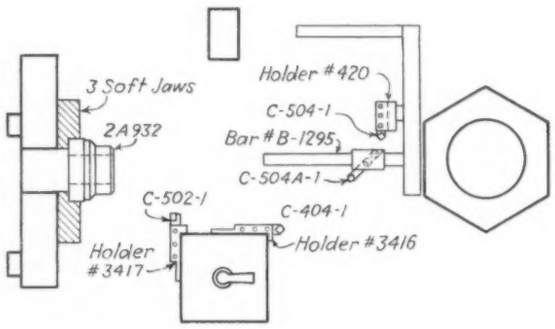
TOOL LAYOUT SHEET

PART NO. 8A-932

OPER. NO. 1

DATE 3-20-40 MATERIAL C.I. DWG. NO. D-1672

NAME OF PART Oil Retainer Bushing MACH. 5 NO. 745



OPERATIONS		R.P.M.	FEED T. POST	FEED TUR.	CUT FEET
Turn large dia. to chuck jaws, 1 cut	C-502-1	402	.015		275
Bore 1/16" small, 1 cut.	C-504A-1	"		.015	225
Turn smaller dia. 1 cut.	C-404-1	"	.015		250
Chamfer small dia.	C-504-1	"		.015	250

BY G.T. CHECKED G.T. PART NO. 2A-932

FORM NO. 96A

FIG. 4—Layout form for supervisory control of carbide tools.

finished dimensions requires specific part-numbers for identification of the finished unit.

Referring again to Fig. 1, note that the ten basic tools are identified by style numbers 01, 02, 03, and on up to 10. These style numbers identify *shapes*, not sizes. These shapes may be altered slightly when the tool is finished ground for use, as will be explained later.

In the upper left-hand corner are listed the eight possible grades of carbide of the Carboloy brand which might be considered for use at some future time. However, grades No. 44A and No. 78A are the two grades in use. A number is given to each grade to be used to identify the grade when making up the tool numbers.

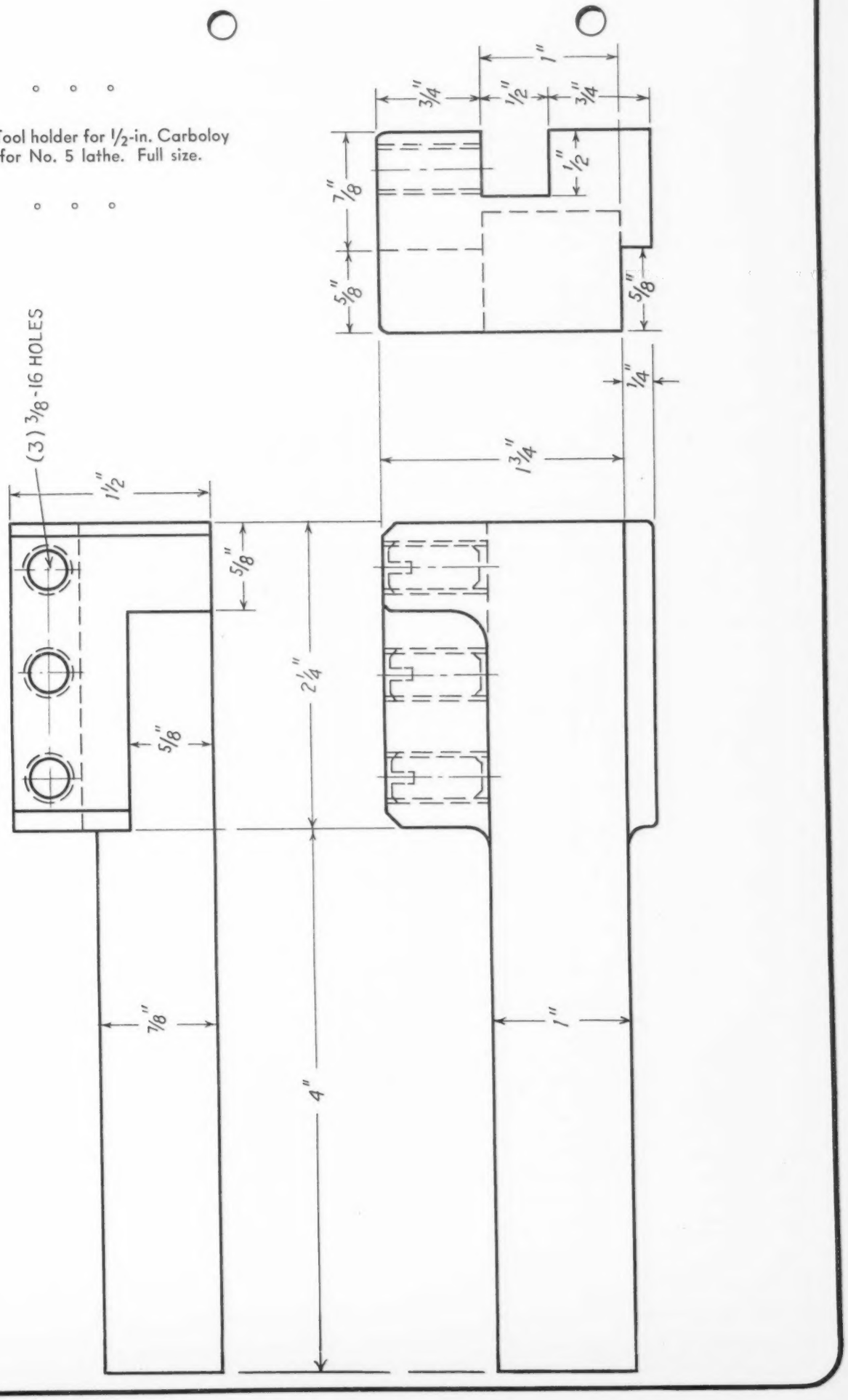
The first left-hand column lists the sizes of the shanks of the tools. These too, are given numbers to identify the size of the shank when tool numbers are applied. For example: If a style 03 tool is desired with a ⅝-in square shank, the basic number of that tool would then be No. 503, in that No. 5 stands for the size of the shank, ⅝ in., and the No. 03 identifies the style of the tool. Likewise if a style No. 02 tool is desired with a ¾x1½-in. shank, the basic number of that tool would be No. 1502. It is not necessary to identify the length of the shank. It would involve too much record keeping for the benefits gained.

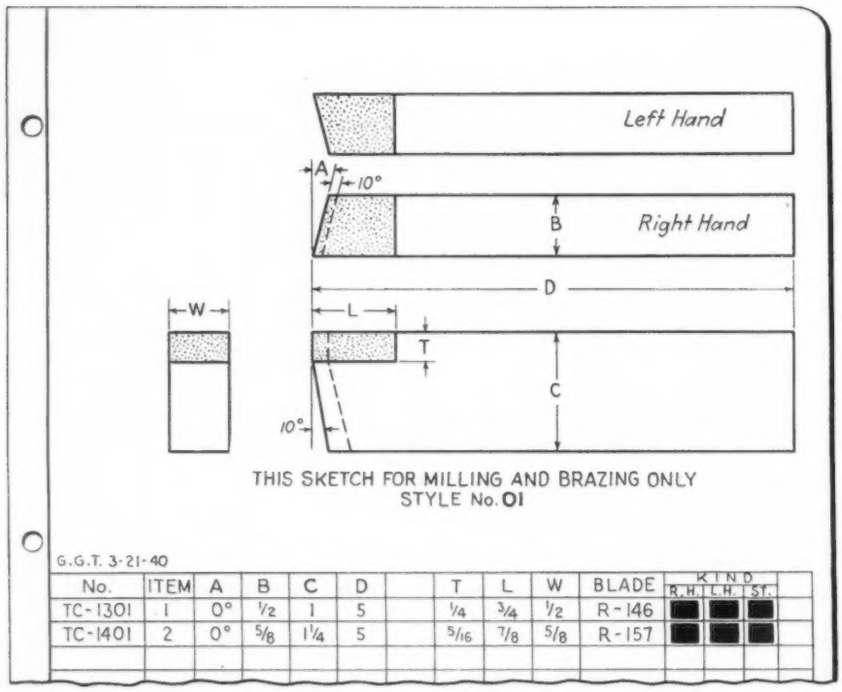
Note that the numbers which have been applied as shown in Fig. 1 denote the sizes of each style of tool that might be found best to carry in stock or to purchase. In other words, this chart provides a graphic picture of all carbide tool sizes available in each style. For example—in style number 01, the basic tool numbers 101 to 2001 show nine different sizes available in this style of tool. Likewise, for style No. 02 there are 11 different sizes. (No. 402 to No. 2002.)

The small columns headed by the word "tray" contain the "address" or number of the tray on which that respective tool is found in the tool-crib. This tray may contain an assortment of *different* tool numbers but only as applied to that particular *style* and *size* of tool. Where tools are small or few in quantity, different styles or sizes can be kept on the same tray. In this case the tray is partitioned to keep the tools separate according to *style*.

Now that carbide tools are available in the rough state and in the predetermined styles and sizes, the next step is to provide the necessary information to the grinding department for grind-

FIG. 5—Tool holder for 1/2-in. Carboloy bits for No. 5 lathe. Full size.

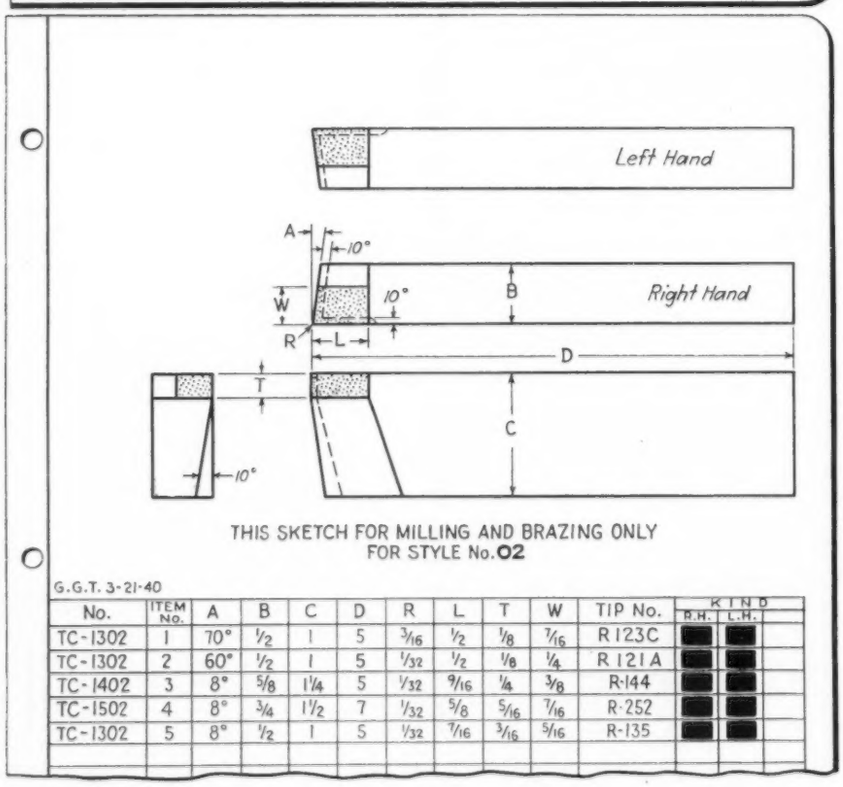




THIS SKETCH FOR MILLING AND BRAZING ONLY
STYLE No. 01

G.G.T. 3-21-40

No.	ITEM	A	B	C	D		T	L	W	BLADE	KIND R.H.	KIND L.H.	KIND ST.
TC-1301	1	0°	1/2	1	5		1/4	3/4	1/2	R-146	■	■	■
TC-1401	2	0°	5/8	1 1/4	5		5/16	7/8	5/8	R-157	■	■	■



THIS SKETCH FOR MILLING AND BRAZING ONLY
FOR STYLE No. 02

G.G.T. 3-21-40

No.	ITEM No.	A	B	C	D	R	L	T	W	TIP No.	KIND R.H.	KIND L.H.
TC-1302	1	70°	1/2	1	5	3/16	1/2	1/8	7/16	R123C	■	■
TC-1302	2	60°	1/2	1	5	1/32	1/2	1/8	1/4	R121A	■	■
TC-1402	3	8°	5/8	1 1/4	5	1/32	9/16	1/4	3/8	R-144	■	■
TC-1502	4	8°	3/4	1 1/2	7	1/32	5/8	5/16	7/16	R-252	■	■
TC-1302	5	8°	1/2	1	5	1/32	7/16	3/16	5/16	R-135	■	■

FIG. 6—Carbide lathe tool, style No. 01.

o o o

ing the various shapes and angles on the various styles of tools.

Fig. 2 shows a grinding sheet for carbide tools. Note that the style numbers still identify the tools which are drawn in three views, with alphabetical designations for the grinding dimensions. Note how consistent these letters apply to the same relative angle of each tool. It makes it easier to remember when grinding because it standardizes the association of each particular letter with a particular definite angle. This helps to cut down errors in grinding. Occasions will arise, however, when it will be practically impossible to hold strictly to this rule; nevertheless the advantages gained make it worth while to follow this policy wherever possible.

Grinding specifications and the assignment of tool numbers are made on the form shown in Fig. 3. This illustration uses the basic tool number 502 as an example. One of these forms is used for each tool number as listed in Fig. 1. As there happens to be 70 different tool numbers shown, there will of course be 70 pages of the form used as shown in Fig. 3. These pages can be kept in a loose-leaf ring book and indexed according to the style. One book is provided for the grinding department and one is kept in the office where tool numbers are originated.

At the top of each page is typed the basic tool number of the tool as shown by the number 502. Only the tools having the size of shank and the style as denoted by No. 5 and No. 02 respectively will be posted on this sheet. This style No. 02 tool is called a "straight side turning tool" and is written in as such on the "name" line. A star preceding the number denotes that the tool is left hand. The size of the shank is then posted and also the size of the carbide blank tip with which the tool is "tipped." It is well to accept the standards of the carbide manufacturer where it applies to size of blanks as related to tool sizes.

o o o

FIG. 7—Carbide lathe tool, style No. 02.

In the columns headed "A", "B", "C", etc., are posted the dimension figures of angles at which the tool is ground. For example—taking the first tool number C-502-1. Column "A" calls for 8 deg. Referring to the grinding sheet Fig. 2 and style No. 02 tool, "A" shows where the 8-deg. angle applies. Likewise, angle "C" shows an angle of 96 deg., which in reality amounts to an actual side-rake angle of 6 deg. If 90 deg. was specified, there would be no side-rake as the top would be straight. Working from a 90-deg. basis in this manner provides greater flexibility in angle specifications, especially where negative side-rakes are desired, as for machining hard bronze.

In the column headed "grade" is posted the manufacturer's grade number which, as stated before, might be No. 44A for cast iron or No. 78A for steel. The column headed "R" contains the radius dimensions which apply to the point of the tool when ground. The radius specification is important in that *a change in the radius means a change in the tool number.* If this rule was not adhered to, there would be too high a mortality in tools because of the excessive grindings. Then too, the tool numbers would be inconsistent as to tool and grinding dimensions.

The column headed "catalog number" refers to the catalog number of the manufacturer. This number as stated before, is practically the pattern number of the tool and is the means of identifying that tool in the raw state, namely, milled and brazed. This catalog number is all that is necessary to specify when re-ordering the tool. The catalog number of this specific 502 tool is S4A7-MB, the MB standing for "milled and brazed."

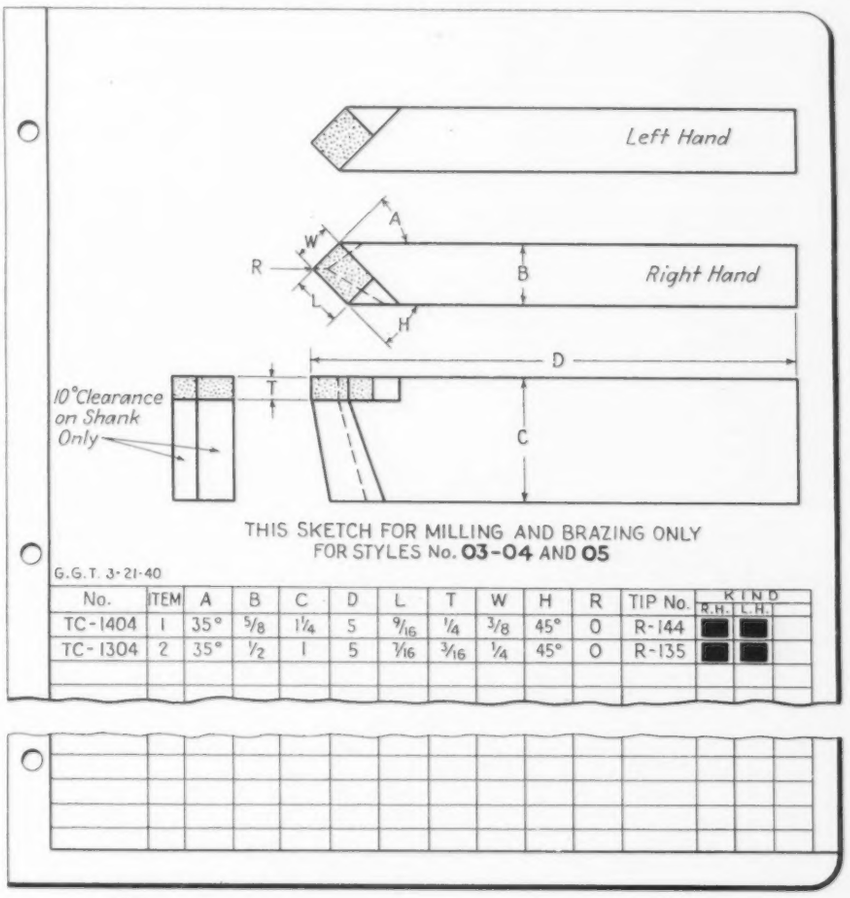
The last column to the right, headed "tool number," contains the number of the tool as ground to specifications. The letter "C" prefixing the number is used to denote the manufacturer, because there are several manufacturers of carbide tools. Thus if "C" stands for Carboloy, "K" could stand for Kennametal, "F" for Firthite, "R" for Rexaloy, "S" for Stellite, etc., and still retain the tool number that identifies that particular tool. It will be noted that the number 502 is always retained and if a grade 44A is used, the number 1 is affixed. If a No. 78A grade is used, the number 6 is affixed because these numbers identify the grade as shown in the upper lefthand corner of the chart Fig. 1.

Tool No. C-502-1 as shown in Fig. 3 has the angles ground as specified in the alphabetical columns and is of a No. 44A grade with 1/32-in. radius on the tool point. This same tool with a 1/16-in. radius on the tool point is shown as C-502A-1. If this style of tool was to be used for cutting steel and had a 1/64-in. radius on the point with a chip curler ground in, the number would be C-502-6. If a steel cutting tool was desired with a ⅛-in. radius on the point, the number would be C-502A-6. In other words, the change in the grinding specifications is noted by the change in the alphabetical status of the tool, while the change in the grade is noted by the affixed number, while the change in the manufacturer's brand is denoted by the change in the letter prefixed to the number. The star in front of the number is placed there as a convenience more than a necessity to distinguish left-hand tools in spite of the fact that numbers change with the left-hand tools as well as with grinding specifications.

After a tool is ground, the number of the tool is etched on the shank with an electric pencil and the tool sent to the tool-crib where it is placed in the proper tray until called for by the shop.

One of the greatest drawbacks to the successful and economical use of carbide tools is the haphazard distribution of the tools to workers in the shop before they have been coached in the proper use and care of the tools. Some workers place little importance upon the grinding technic of carbide tools and unless restricted will sharpen the tool on hard emery wheels, or dip the tool in cold water when it becomes hot and thus cause minute fractures in the carbide—a complete tool destruction. Naturally, when the tools fail to perform under this condition, the worker condemns the tool and the boss condemns the cost.

Carbide tools produce in a "dollar" language if given proper supervision—"dollar" supervision. Their value to the manufacturer who uses them is not the purchase price or inventory value, but is proportionate to the intelligent application and supervision of the tool as it produces. The cost of first class supervision of tools often cannot com-



No.	ITEM	A	B	C	D	L	T	W	H	R	TIP No.	KIND R.H.	KIND L.H.
TC-1404	1	35°	5/8	1¼	5	9/16	¼	3/8	45°	0	R-144	■	■
TC-1304	2	35°	½	1	5	7/16	3/16	¼	45°	0	R-135	■	■

FIG. 8—Carbide lathe tools, style Nos. 03, 04 and 05.

pete with the low price of high speed steels. It is cheaper to pay for the excess wear of high speed steels—but not so with carbide tools. A tool that is making chips is a paying tool and carbide tools are too expensive to be idle or mistreated—hence, supervision.

One method by which supervisory control is had over carbide tools is through the use of the *"layout"* form, as shown in Fig. 4. This layout is made up by the man in charge of carbide tools. He can do this in the office from drawings or from actual set-ups of the job in the shop. If all the speeds and feeds are available as well as all the necessary tool data, it would be productive of quicker results to make these layouts from drawings in the office. In this manner thorough study can be given as to the set-up and tooling arrangement that would be most efficient. Then too, there would be no interference with the worker in the shop.

The layout should be drawn in triplicate. The original stays in the office files; the duplicate is placed in a transparent envelope, preferably 5x9 in. so that one folding will show the layout from both sides. This is sent to the tool crib as authority to the tool crib attendants to give out the carbide tools as called for on the layout for that particular operation. The triplicate copy should be given to the time study department for analysis for possible rate adjustments. The attendants are under strict instructions not to give out any carbide tools other than those called for on the layout. When the tool becomes dull, the operator returns the dull tool to the tool crib and receives a sharp one in return. The exchange is made *tool-number* for *tool-number*, NOT tool for tool. The tool crib attendant sends the dull tool to the grinding room where the tool is ground as per specifications on the "grinding sheet" after which it is returned to the crib where it is again made available to the shop.

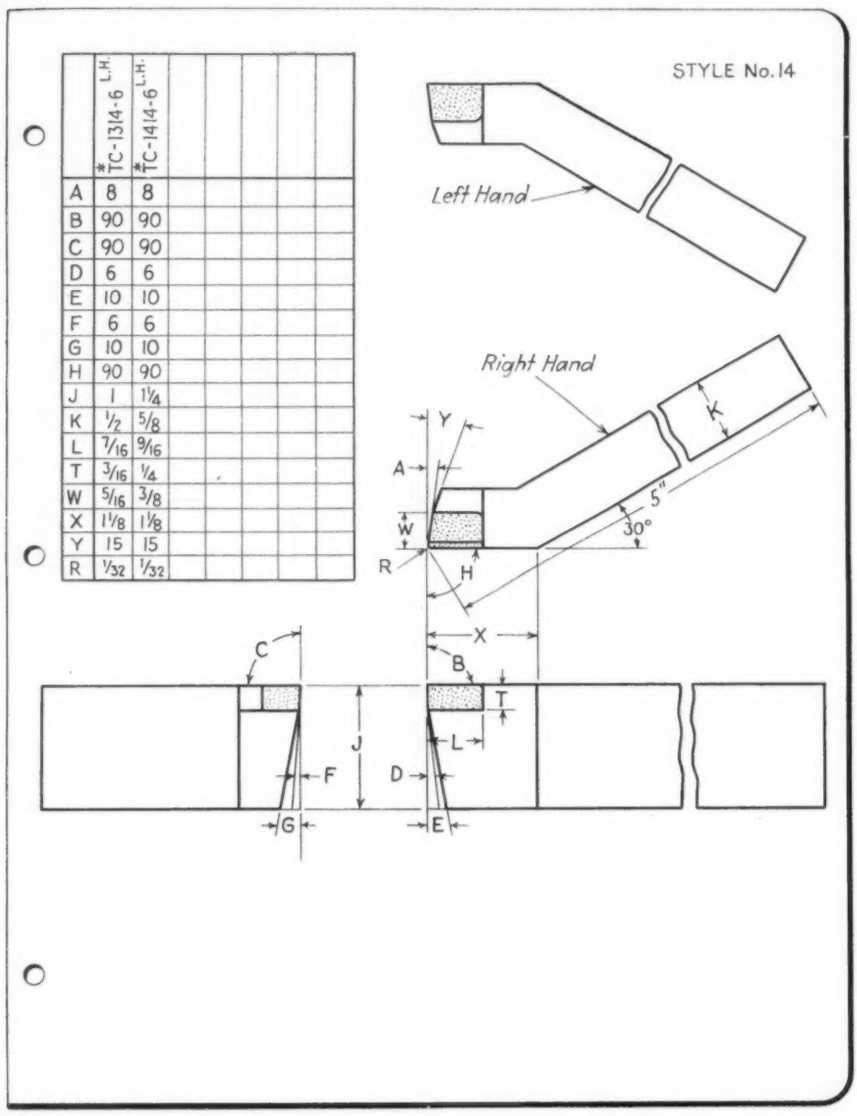


FIG. 9—Facing tool for No. 12 automatic lathe. This drawing serves for the milled and brazed dimensions of three different types of tools, namely 03, 04, and 05.

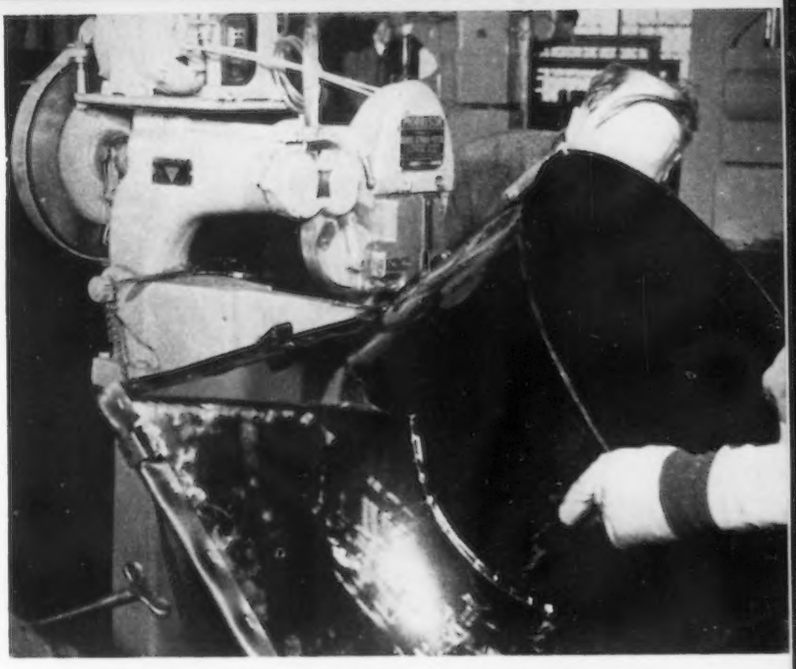
Oftentimes condemnation is placed upon carbide tools when the fault lies strictly in the grinding. It is surprising how a carbide tool will perform after a small, apparently insignificant change has been made in some angle of the tool. Especially was this true in the grinding of cutting tools for roller turners on bar stock machines. This type of tool is shown as style No. 09 in Fig. 1, but owing to its successful operation being extremely dependent on adhering to specific grinding dimensions, a separate drawing is furnished as shown in Fig. 5. It took weeks of research to develop this tool so that it would perform satisfactorily. The angle dimensions as shown are for the use of this tool in a Gisholt turner as used on a Gisholt No. 5 and No. 1L high production lathe.

This tool, in the 78A grade, has turned out work with such gratifying results — especially on heat treated steels—that it was adopted exclusively. An important feature of the success of this tool is the "land" of approximately 0.015 in. to 0.020 in. on the cutting edge.

Another tool that has proved very popular, especially on turret lathes, is the holder as shown in Fig. 5. It is a recognized fact that vibration and chatter are poison to carbide tools. Much of the work in some machine shops can be done more economically with tool-bits, provided good solid and rugged holders are furnished. The holder as shown in Fig. 5 is just this type—very simple and economical to make. Note how it hugs up close to the turret tool post as shown in Fig. 4, permitting solid and rigid clamping. The offset permits bringing the tool up close to the chuck or work—a very ideal condition. The tool-bit capacity can be varied in proportion to the ½-in. capacity, as shown on the drawing. This holder will be found very handy in the left-hand style for counter-boring operations with carbide tools.

(CONCLUDED ON PAGE 92)

WIRE STITCHING OF STEEL SHEETS



AIR intake shroud for Yellow Coach engine cooling is framed in a rubber strip which is stitched to 16-gage steel. Stitching is preferred to the use of adhesive because it is a precautionary measure against loosening of the rubber strip which might become entangled in the engine fan. Other steel stitching operations in the General Motors truck plant include fastening anti-squeak material to fuel tank straps and asbestos to sheet metal for insulation purposes.

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A HISTORY of more than 50 years of wire stitching and stapling on non-metallic materials preceded the first successful introduction of steel stitching equipment in the plants of metal fabricators less than five years ago. All of these stitchers operate on a principle very much like the common stapler used for clipping sheets of paper together, except that stitchers, unlike staplers, are fed with wire which is cut by the machine and formed into clips accommodated to the thickness of the material being assembled. In the past, stitchers have been used largely on wood and fibrous materials, frequently in packaging or similar operations.

It is estimated now that there are more than 400 installations in metal fabricating plants, generally eliminating pre-punched parts and replacing in many instances spots welds, rivets, screws, bolts, tacks, nails or other holding devices. Several hundred of these installations are in automobile plants and others are in allied metal fabricating plants.

The steel stitcher forms its own staple by cutting off the required length of wire and bending the wire over a small die into an approximate U-shape, inverted, which is guided to the work surface and kept in alinement by steel guide blocks. Each of the two ends of the wire serves as a punch, going easily through several thicknesses of mild steel backed by an anvil. After the piercing operation, the protruding ends of wire strike the hardened steel anvil, which is shaped to bend the ends of the wire inward, forming the closed staple or stitch.

Foot-treadle operation, adjustable by the turn of a knob to non-repeat or continuous stitching, is used, so the operator's hands are free to guide the material to the work.

Capacity of steel stitchers in use in auto plants is great enough to permit fastening together sheets of steel up to a combined thickness of 0.060 in. Other combinations of material up to ¾-in. total thickness can be stitched on the machines in common use. It is not difficult to stitch together two pieces of 18-gage mild steel, and there are examples of this in auto body plants, but most applications consist of stitching approximately 20-gage steel to materials such as asbestos, automotive anti-squeak and rubber strip, plywood, Masonite, etc.

Spools of high-carbon steel wire are mounted on the machine in 5 and 10-lb. coils, fed through by a positive drive mechanism. Wire gages from 16 to 20 are used, with most operations favoring 18 or 20 gage. Stitches can be made at a rate up to 300 per min., with the average cost estimated at 9c. per 1000 stitches. It is reported that the utilization of 18 Morrison steel stitchers in an automotive body plant resulted in a saving of $160,000 in a year compared with the cost of a combination of methods previously used. These machines are powered by ¼-hp. motors and manufactured by the Seybold Division of Harris-Seybold-Potter Co., Dayton, Ohio.

Passage of sheet metal work through the machines is facilitated by an open-throat design that is made in 8 and 20-in. standard machines and also available in 25 and 30-in. throat models for special work.

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CLOSEUP of throat opening of Morrison steel stitcher. The wire feeds down at the left and then horizontally into the jaws of the machine where it is clipped to the proper length, formed and then forced through the materials to be assembled. The hardened steel anvil and work rest forms the lower jaw of the machine.

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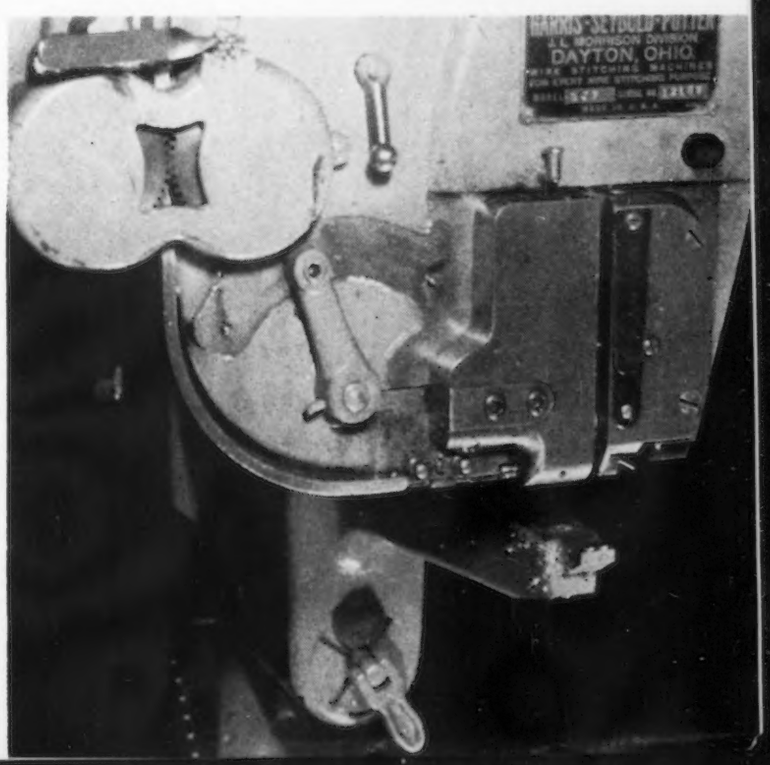

WHAT'S NEW IN

JUDGING from announcements made in recent months, the principal developments in presses have been in general utility hydraulic types. Speeds are being stepped up to those of mechanical presses. The employment of a novel turret workholder brings mass production methods to the drawing of cartridge shells. Welded steel construction predominates in hydraulic presses and press brakes, which are being made larger for specific applications in the aircraft industry.

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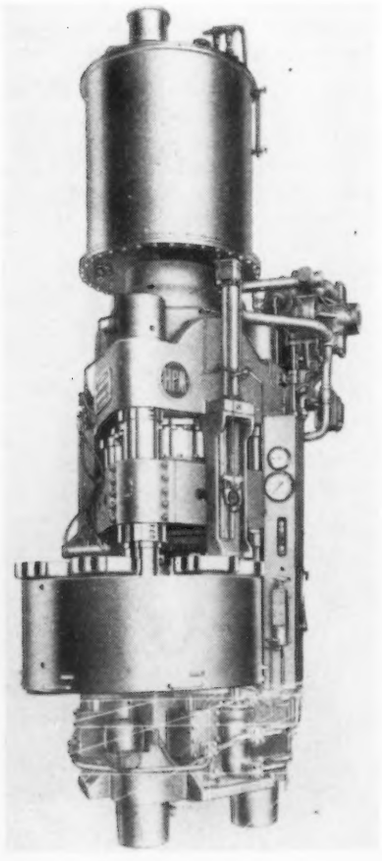
SOME unusual design principles have been incorporated in a line of H-P-M Fastraverse cartridge case heading presses with maximum tonnages ranging from 550 to 3000 tons, to accommodate shell sizes from 37 to 155 mm. The press frame and operating system are the standard design of the *Hydraulic Press Mfg. Co.*, Mount Gilead, Ohio, except that three strain rods are used in place of the conventional four, and one rod is used as pintle about which a six station turret is revolved. The main pressing position is directly below the ram for heading. The station preceding the heading station is used for indenting the blank by means of a tool on the main platen, and the station beyond the heading position is employed for ejecting the cartridge case. The remaining three stations, which are outside the press, are used for loading. Production with the turret is said to be four to five times that of a conventional single action press.



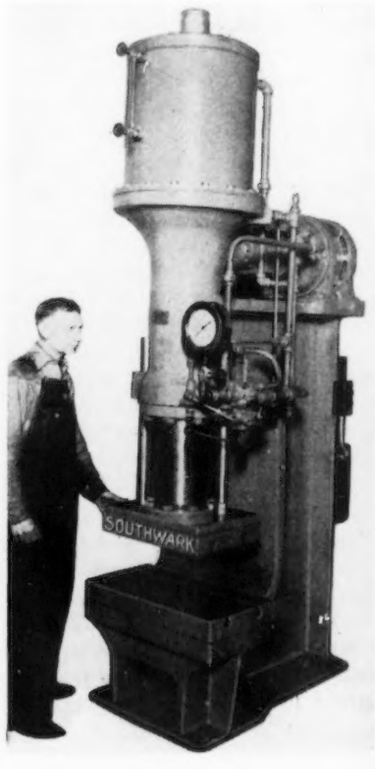
During the pressing operations, the turret is solid against the bed. Before indexing, two hydraulic rams automatically lift the turret to contact a central roller bearing on the axial strain rod. Ejection of the piece is accomplished by a hydraulic ram beneath the turret ejecting station, and a manually operated air hoist with clamping fixture is used to lift the headed case clear of the turret. The press cycle is semi-automatic, it being necessary for the operator to initiate each complete cycle by push button control. A 40-hp. motor is required to drive the 550-ton press pump. Larger sizes call for a 100-hp. motor.

High Speed Hydraulic Press

BY combining its Fastraverse principle, closed hydraulic circuit and reversible, variable delivery radial piston pump, the *Hydraulic Press Mfg. Co.*, has been able to build a 250-ton hydraulic press that made 47 cycles per min, on its test run. This is believed by the company to be the fastest press of its kind ever built. Its speed is equal to mechanical type presses. In the Fastraverse system, the slide advances to the work by gravity and the oil prefills the pressure cylinder by gravity, flowing through a surge valve mounted in the open end of the press cylinder. This valve automatically closes as soon as pressure is built up in the main cylinder and opens as soon as pressure is released. The pump therefore is used only to build up pressure in the cylinder after it has been prefilled and to apply pressure to the pushback rams or annular area of a double acting piston type ram for returning the pressing member to its starting position. In the closed circuit, no valves are employed, reversal of operation being effected by reversing the pump discharge. This reversal is accomplished without shock even in high speed operation.

Multi-Purpose Hydraulic Presses

TWO new presses of simplified design for general utility work are being offered by *Baldwin South-*



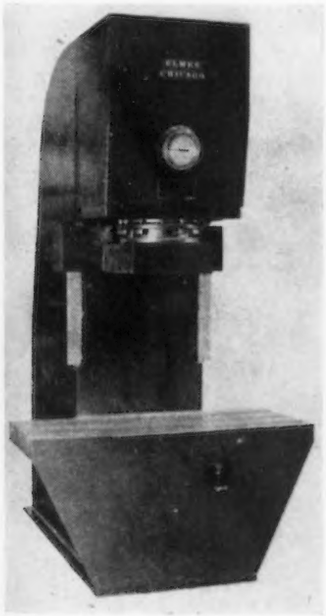
PRESSES

By FRANK J. OLIVER
Associate Editor, The Iron Age

wark Division, the *Baldwin Locomotive Works,* Philadelphia. Built in 65 and 80-ton capacities, these presses have controls similar to those used on larger Baldwin Southwark Hyspeed presses, but the construction has been simplified to effect savings in manufacturing costs. A single control, either hand or foot operated, permits the operator to inch, stop or reverse the platen at any point of its stroke, a feature making the presses useful in assembly and straightening work. Another setting of the control makes the presses semi-automatic in operation, including rapid approach until work is contacted, building up of a predetermined pressure, and reversal. The platen can also be reversed after it has reach a given position.

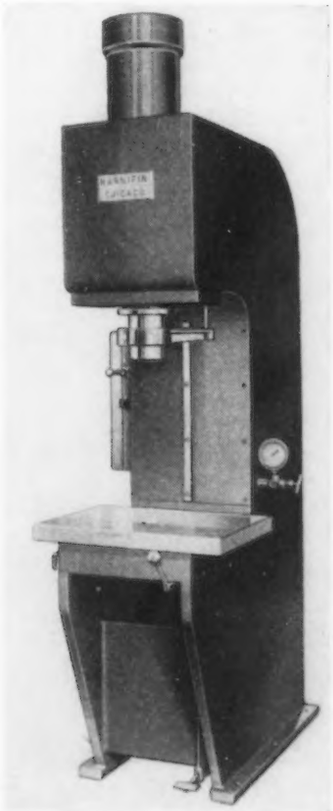
Open Side Press

SINGLE lever operation is also featured in the general purpose open side hydraulic press made by the *Charles F. Elmes Engineering Works,* Chicago. Pushing the lever down rapid advances the platen, which automatically slows down when the work is reached. Releasing the lever returns the lever at a high rapid traverse rate. Stroke of the moving platen can be decreased to cut down idle movement of the platen during production work. The press is of steel construction and is properly reinforced to give the maximum amount of rigidity. Bed is located at convenient working height and is provided with slots for fastening jigs or fixtures. Slots are also provided in the moving platen, which is guided on adjustable gibs. Pumps, motor and starter are inclosed within the frame.



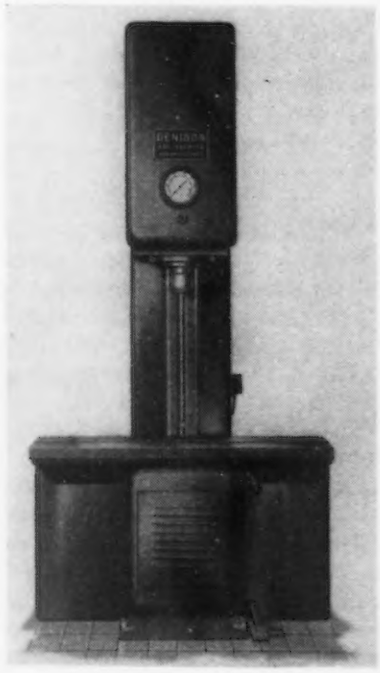
25-Ton Forcing Press

A HYDRAULIC forcing press of 25-ton capacity, featuring welded steel frame construction, built-in motor-driven hydraulic power unit, and the Hannifin sensitive pressure control, has been introduced by the *Hannifin Mfg. Co., Chicago.* The table measures 30 x 22 in.; gap 25 in.; reach 15 in. and overall height 113 in. Table to floor is 40 in. and stroke 24 in. Operating speeds are 83 in. per min. power stroke, 157 in. per min. return stroke. The hydraulic power unit is driven by a 10-hp. motor.



Straightening Presses

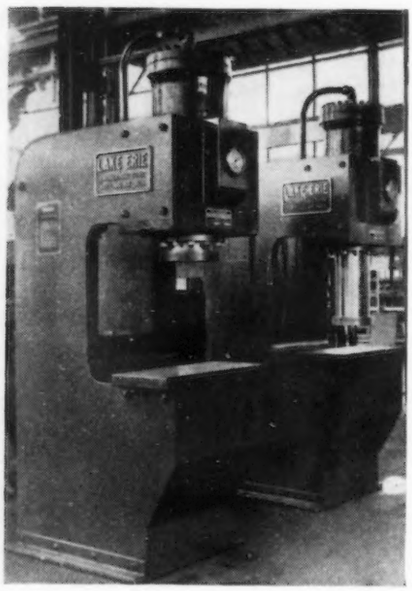
VERTICAL hydraulic presses for straightening, forcing and general production pressing are being offered in 25 and 50-ton capacities by the *Denison Engineering Co.,* Chestnut and Water Streets, Columbus, Ohio. For both sizes the stroke is 18 in. and depth of throat, 10 in. Down ram speeds are 15 and 13 in. per min., respectively, and return speeds, 34 and 25 in. per min. Frames are of electrically welded steel plate, with all corners and edges rounded for safety and good appearance. These are also self-contained units, with pump and motor in the base with the oil supply tank. Operation is either by a hand lever or foot pedal. Once the ram has contacted the work, further pressure build up is obtained by further movement downward of the hand lever or



pedal. Ram automatically returns to its up position upon release of the controls.

Straightening Press

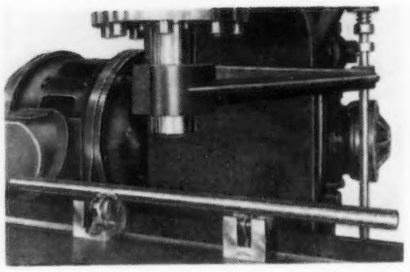
ADDITION of a line of hydraulic straightening presses using a C-gap frame design is announced by the *Lake Erie Engineering Corp.*, Buffalo. The press illustrated is rated at 66 ton capacity. Pressures are controlled by a hand lever. Stroke is 16 in., with operating speeds of 55



in. per min. closing, 31 in. pressing and 70 in. per min. return. Pumping unit is contained in the base. Heavy steel side plate design assures rigidity. This press is adapted for all types of straightening work including finished shapes after drawing or forming, such as aircraft parts.

Straightening Blocks

STRAIGHTENING or round shafts can be speeded up with a new set of combination blocks and test rolls developed by the *Greenerd Arbor Press Co.*, Nashua, N. H. When placed on the blocks, the shaft rests upon two sets of hardened rolls mounted on springs. In this position, the operator can spin the shaft to locate the high spot. Then without removing the shaft from the blocks, the operator can bring the ram pressure to the work. This pressure causes the rolls to recede on their swinging arms and the work comes to rest on two V's for straightening.



As soon as pressure is relieved, the rolls again pick up the shaft for retesting for straightness.

The same company has also announced the addition to its line of a 6-ton hydraulic press, similar in general features to the 10-ton unit described in the Jan. 25 issue of THE IRON AGE.

Tandem Hydraulic Stretching Press

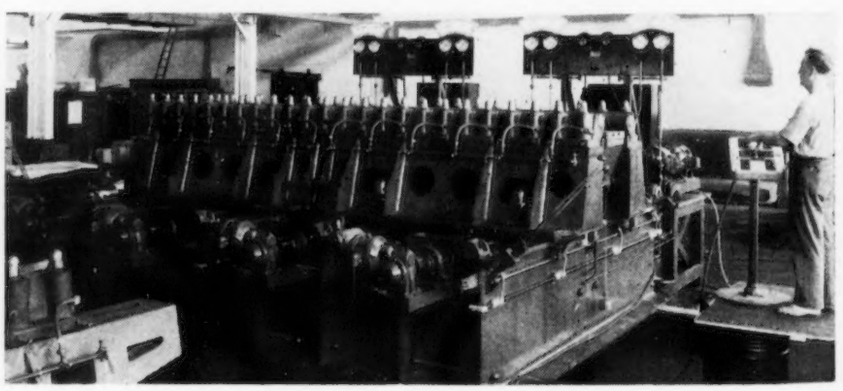
TWO of its 150-ton hydraulic stretching presses have been combined in tandem by the *Engineering & Research Corp.*, Riverdale, Md., to form a single unit capable of holding a single sheet 99 in. long between the hydraulic hold-down clamps. Cross distance between clamps can be varied from 24 to 80 in. The common table is 97½ in. long and 17 in. wide. On this table are mounted the forming dies, usually made of wood, which are pushed up into the constrained sheet by a pair of hydraulic rams. Maximum stroke is 12 in. The motors shown in the illustration are for traversing the clamp supports across the I-beam rails at a speed of 30 in. per min. To enable swiveling up to 10 deg. either way, each main clamp support is arranged for individual motor drive. Two Northern high pressure (up to 3000 lb.) variable pressure pumps are employed, each driven by a 10-hp. motor. The traverse motors are 1½ hp. each.

Molding Press

THE 20 x 20-in. hydraulic press illustrated is one of 12 recently built by *Farrel-Birmingham Co.*, Ansonia, Conn., for the molding of small rubber and plastics articles. This press exemplifies the principle of modern streamlined design. The housing, which includes the top, bottom and sides, is a single casting. Cylin-

der set in the base is made of Meehanite. The press operates at an initial water pressure of 2000 lb. per sq. in., giving a total pressure of 113 tons or 563 lb. per sq. in. on the platens.

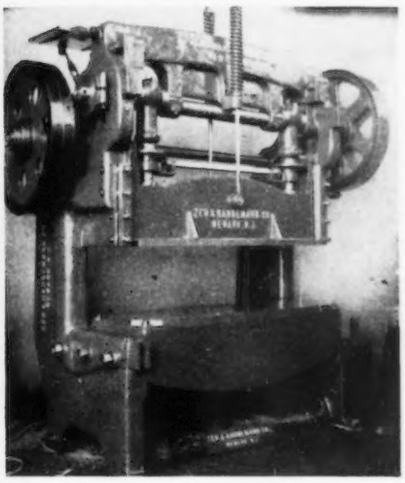
The three 20-in. square steel plates are drilled to permit maximum steam circulation and uniform heating. The



steam connections are flexible metallic tubing and are fully enclosed in the housing. The temperature of the platens is automatically controlled by an air-operated diaphragm valve, and together with the steam, air and water pressure, is indicated by gages mounted in a panel.

Double Crank Press

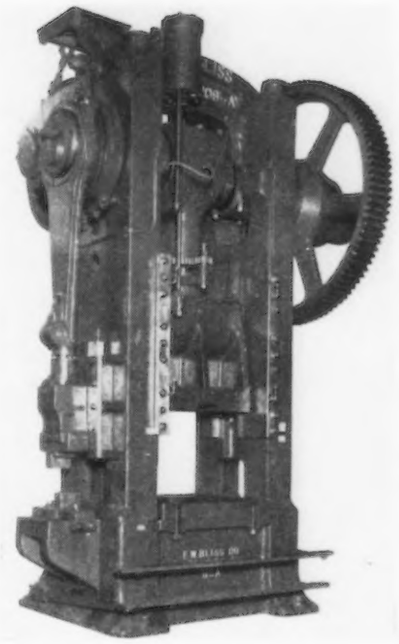
TWO sizes of double-crank presses of overhanging construction, known as type 13, have been aded to the line of *Zeh & Hahnemann Co.*, 182 Vanderpool Street, Newark, N. J. The design is such that various length dimensions can be furnished, although the standard width of the 25-ton press is 36 in. and of the 36-ton press, 60 in. Both sizes have a bed depth of 20 in. Standard strokes are 2 and 3 in., respectively, although these can be varied up to 6 in. maximum. Slides on the large size are



spring balanced. Frames are made of gray iron castings. Both plain and geared types are made, the former operating at approximately twice the speed of the latter. Clutch is a patented pin type. Other sizes are to be built.

Heavy Duty Trimming Press

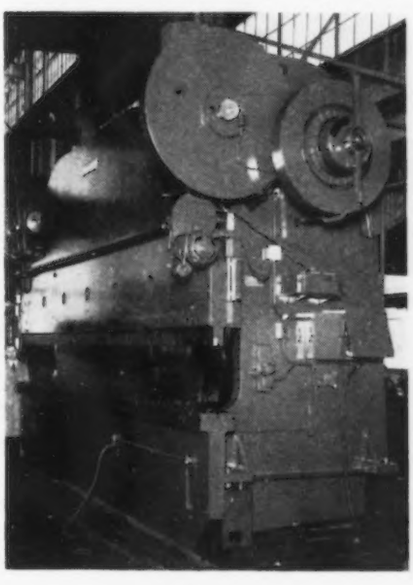
THE *E. W. Bliss Co.*, 53rd Street and Second Avenue, Brooklyn, is announcing a new line of trimming presses designed to meet the high production requirements and hard usage of the forge shop. The No. 209½-A straight sided single crank press illustrated is typical of the line. It is equipped with an outside slide or cut-off attachment for cutting the flash from the bars, punching holes and trimming. Press is of the tie rod construction, with the steel tension



rods shrunk in at over 100 per cent of press rating, and with beam and compression members cast from modern high strength irons. The old split clamping action in the connections has been supplanted by solid straps with a cross grip action insuring positive holding. Other features of the press shown are a fast acting, rolling key clutch, V-belt drive, extra wide bed and slide, and air counterbalance for the slide. Machine operates at 25 strokes per min.

Large Size Press Brake

RECENTLY installed in the Alcoa (Tenn.) plant of the Aluminum Co. of America was this 340 series

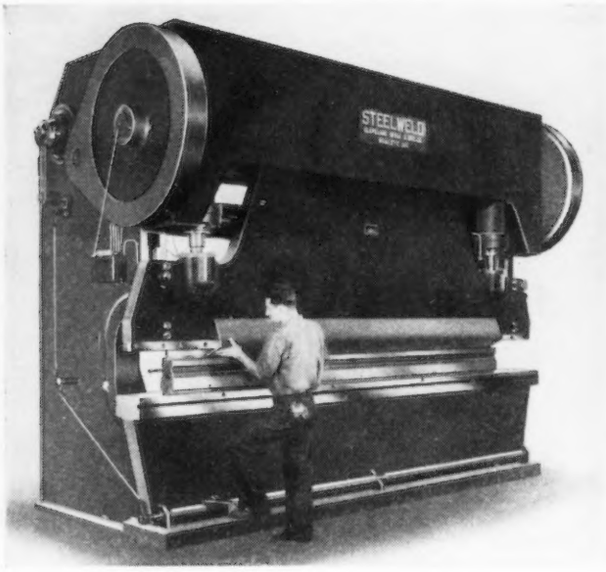


all-steel Cincinnati press brake, built by the *Cincinnati Shaper Co.*, Cincinnati. Said to be the largest ever built for aircraft work, it has an overall die surface of 21 ft. 3 in. and a distance between housings of 18 ft. 6 in. Housings, bed and ram are of rolled steel plate. Machine is equipped with taper adjustment to the ram, air counterbalances, tonnage load indicator, electric clutch control and automatic electric overload clutch release. Such a brake will be used for corrugating fuselage and wing stiffeners and for forming channel sections, cap strips and wing tip sections of transport and military planes on a production basis.

Pneumatic Die Cushion

WHERE extremely heavy ring holding pressures are wanted in a limited space beneath the press bed proper, the *Dayton Rogers Mfg. Co.*, 2830 South 13th Avenue, Minneapolis, has developed a new design of pneumatic die cushion, known as

model H and made in four sizes—singly or in multiples of two, four and six units. These telescoping cylinders make it possible to mount this type of cushion on a given press without having to provide a pit for it. Accurate guidance of the pin pressure pad is assured, and this feature of the design makes these cushions adaptable to all kinds of work requiring balanced pressure on the draw ring. Each cushion is complete with regulator and gage, surge tank and other equipment, ready to install. When the cushion is not needed, the cylinders may be bled, allowing the pin plate to drop down and leaving a free opening in the bolster plate for blanks to drop through. If the device is mounted on an inclinable press, the retraction of the cylinder will allow



blanks and slugs to drop off the pin pressure pad into receivers below the press.

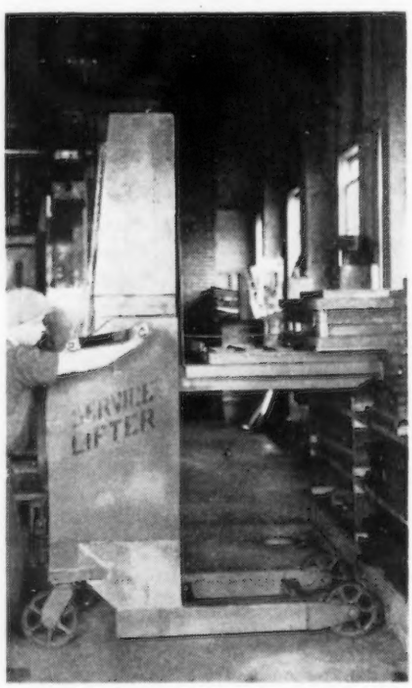
Bending Press

BENDING, forming, blanking, drawing, rubber forming and multiple punching operations can be performed on this model J-12 Steelweld bending press, recently added to the line of the *Steelweld Machinery Division* of the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio. The press will handle plate up to 12 ft. x 5/16 in. between housings and up to 14 ft. over total length of bed and ram. Even longer lengths can be bent by extending the bed and ram at the ends as shown. The ram is operated by two eccentrics and each is provided with three large main bearings and an eccentric bearing, automatically lubricated by oiling units at each end of the machine. All gears are protected with metal covers. Machine is of cleancut lines and has a single one-piece welded steel frame. The usual 18-in. throat, standard on all Steelweld machines, is provided.

Power Squaring Shears

CONVENIENT arrangement of controls and gages, full visibility of the cutting line, quick acting clutch, and complete accessibility at rear, as well as increased operating speeds, are said to result in more working strokes per hour in the new J1 series power squaring shears, built in sizes ranging from 10 gage to ½ in. by the *Niagara Machine & Tool Works*, Buffalo, N. Y. These machines have a new ball bearing, self measuring parallel back gage, with dial on the handwheel control reading to 1/64 in. and a plunger type indexing handle engaging holes for each 1/128 in. of gage bar travel. Provision is made for cutting tapers. The gage bar itself is exceptionally rugged and is stiffened with a truss rod.

Drive mechanism includes a Niagara 14-point sleeve clutch with built-in single stroke mechanism and a safety lock to prevent engagement when adjusting knives or gages. Gears are mounted between anti-friction bearings and operate in an oil bath. V-belt drive is standard equipment. Alinement of bed and housings is assured by fitted keys at each end of the bed. Recessed hand grooves add convenience and safety in handling sheets on the bed top. Pockets in top of bed also save time in mounting knives. Full length T-slots for quick attachment and accurate adjustment of slide, bevel and front gages to simplify and expedite gage setting are other features. The massive beds are designed to form a strong, rigid backbone for the entire shear and to provide a solid support for the lower knife.



Die Handling Truck

THREE die handling operations are combined in a new portable lifter (left), placed on the market by the *Service Caster & Truck Co.*, 511 N. Brownswood Avenue, Albion, Mich. Dies can be taken from or replaced in the storage shelf, transported, and placed or removed from the press. For pulling a die set off a shelf or the press, a steel cable is run from a winch inside the frame and is attached to the die with a bolt and nut. Winch handle is at convenient height. Lifting unit is also hand powered and has two speeds. Lowering speed is limited by a heavy duty flyball governor. Load is supported on two roller chains and capacity is 400 lb. Overall height of unit is 8 ft., but a worm gear safety hinge permits folding over the top half of the machine to pass through doorways. Platform measures 36 in. long by 30 in. wide, and on this a 30 x 30 in. roller platform is placed. Lowered height is 11 minimum.

American Iron and Steel Institute's Report of Pig Iron and Ferroalloy Production in 1939

PRODUCTION OF PIG IRON AND FERRO-ALLOYS

	1935	1936	1937	1938	1939
PIG IRON:					
Pennsylvania	6,137,367	10,195,220	12,735,786	5,416,285	9,809,487
Ohio	6,310,674	8,071,454	8,852,417	4,715,776	8,033,411
Indiana, Mich.	3,246,295	4,668,495	5,288,994	2,628,993	4,786,803
Md., Va., West Va., Ky., Tenn.	1,994,911	2,354,359	2,835,232	2,030,954	3,116,744
Illinois	2,243,795	3,267,058	3,837,250	1,855,382	2,968,606
Alabama	1,453,715	2,237,997	2,890,355	2,266,060	2,935,685
Mass., New York	1,585,646	2,486,984	3,184,480	1,459,603	2,422,844
Minn., Iowa, Col., Utah	302,048	560,965	840,633	398,545	735,102
Total	23,274,451	33,842,532	40,465,147	20,771,598	34,808,682
FERRO-ALLOYS:					
Pennsylvania	246,341	370,119	489,793	184,687	309,543
Ohio, Iowa	126,724	183,874	193,064	171,078	239,197
New York, N. J.	218,715	272,357	290,733	213,282	191,802
Va., West Va., Ala., Tenn.	71,192	83,807	143,813	119,519	127,873
Total	662,972	910,157	1,117,403	688,566	868,415
Grand total	23,937,423	34,752,689	41,582,550	21,460,164	35,677,097

PIG IRON MADE FOR SALE IN 1939

States	Basic	Bess. & low-phos.	Foundry	All Other	Total
Massachusetts, New York	145,075	60,418	332,320	310,147	847,960
Pennsylvania	397,639	207,560	113,935	83,857	802,991
Md., W. Va., Ala., Tenn.	119,997	4,329	968,861	36,130	1,129,317
Ohio	162,791	87,938	170,026	396,325	817,080
Indiana, Illinois	106,682	7,645	106,233	441,782	662,342
Mich., Minn., Ia., Col., Utah	321	.....	76,070	19,528	95,919
Total	932,505	367,890	1,767,445	1,287,769	4,355,609

HALF-YEARLY PRODUCTION OF PIG IRON AND FERRO-ALLOYS

States	Blast furnaces (a)				Production		
	In blast June 30, 1939	Dec. 31, 1939					
		In	Out	Total	First 6 months 1939	Second 6 months 1939	Total 1939
Mass.	1	1	0	1	917,610	1,505,234	2,422,844
New York	8	11	3	14			
Penna.	29	57	13	70	3,613,891	6,195,596	9,809,487
Maryland	6	6	0	6	1,286,795	1,829,949	3,116,744
West Va.	3	3	0	3			
Kentucky	2	2	0	2			
Tennessee	1	1	0	1			
Alabama	13	16	1	17	1,378,236	1,557,449	2,935,685
Ohio	26	41	5	46	3,145,641	4,887,770	8,033,411
Illinois	8	14	9	23	1,206,350	1,762,256	2,968,606
Indiana	9	17	2	19	1,918,019	2,868,784	4,786,803
Michigan	5	7	1	8			
Minnesota	1	2	0	2			
Iowa	0	0	0	0	324,428	410,674	735,102
Colorado	1	3	0	3			
Utah	1	1	0	1			
TOTALS:							
Pig iron	114	182	34	216	13,790,970	21,017,712	34,808,682
Ferro-alloys-Blast furnaces	7	13	3	16	252,194	335,602	587,796
Electric furnaces	....	....	....	....	132,611	148,008	280,619
Grand total	121	195	37	232	14,175,775	21,501,322	35,677,097

(a) Completed and rebuilding blast furnaces.

HALF-YEARLY PRODUCTION OF PIG IRON BY GRADES AND FERRO-ALLOYS BY KINDS

BASIC PIG IRON

States	First 6 months 1939	Second 6 months 1939	Total 1939
Massachusetts, New York	599,846	962,742	1,562,588
Pennsylvania	2,695,560	4,372,743	7,068,303
Maryland, West Virginia, Ky., Ala.	2,021,997	2,522,008	4,544,005
Ohio	2,070,156	3,166,749	5,236,905
Indiana, Illinois	2,122,259	3,232,257	5,354,516
Michigan, Minnesota, Colorado, Utah	764,454	907,097	1,671,551
Total	10,274,272	15,163,596	25,437,868

BESSEMER AND LOW-PHOSPHORUS PIG IRON

Pennsylvania	840,523	1,698,480	2,539,003
New York, Md., West Va., Ala.	239,189	381,842	621,031
Ohio	801,932	1,370,819	2,172,751
Indiana, Illinois	249,799	388,050	637,849
Total	2,131,443	3,839,191	5,970,634

FOUNDRY PIG IRON

Massachusetts, New York, Penna.	217,293	228,963	446,256
Maryland, Ky., Tenn., Ala.	459,210	576,433	1,035,643
Ohio	78,744	91,282	170,026
Indiana, Ill., Mich., Minn., Col., Utah	88,863	170,080	258,943
Total	844,110	1,066,758	1,910,868

MALLEABLE PIG IRON

Massachusetts, New York, Penna.	100,442	295,489	395,931
Ohio	187,901	243,895	431,796
Indiana, Illinois, Michigan, Minnesota	220,169	338,441	558,610
Total	508,512	877,825	1,386,337

FERRO-ALLOYS BY KINDS

Ferro-manganese and spiegeleisen	164,777	288,797	453,574
Ferro-silicon	195,528	166,830	362,358
Other ferro-alloys	24,500	27,983	52,483
Total	384,805	483,610	868,415

PRODUCTION OF PIG IRON AND FERRO-ALLOYS IN 1939

(For sale and for maker's use)

	For sale	For maker's use	Total
PIG IRON:			
Basic	932,505	24,505,363	25,437,868
Bessemer and low-phosphorus	367,890	5,602,744	5,970,634
Foundry	1,767,445	143,423	1,910,868
Malleable	1 223,552	162,785	1,386,337
Forge or mill	3,800	.....	3,800
White and mottled, direct castings, etc.	60,417	38,758	99,175
Total	4,355,609	30,453,073	34,808,682
FERRO-ALLOYS:			
Ferro-manganese and spiegel	219,500	234,074	453,574
Ferro-silicon	355,585	6,773	362,358
Other ferro-alloys	52,483	.....	52,483
Total	627,568	240,847	868,415
Grand total	4,983,177	30,693,920	35,677,097

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

o o o

. . . Auto output revised downward under 100,000 mark for week . . . Early auto show will have Ford as participant . . . Buying trend improvement is registered in long-term brackets . . . Restrictions on Swedish steel imports turn valve spring manufacturers to domestic sources.

DETROIT—Auto production totals—index of Detroit's *current* activity—showed a drop this week, but buying trends—forerunner of industrial activity *ahead*—showed improvement indicative of generally better business conditions anticipated in this area.

The downward movement of the car production curve to a point below the 100,000 mark is the first significant change in the current season's output, although once before, in mid-February, there was a temporary slump below the 100,000 mark. However, it is not expected that May output will be substantially less than that of April; the reduction is not likely to be more than a few thousand units per week on the average.

Output for the last week is placed at 99,305 passenger cars and trucks in the United States and Canada, compared with 101,405 in the previous week, according to Ward's Automotive Reports. The decrease is much less than in the corresponding period last year when production dropped sharply from 86,640 a week to 71,420. Total estimated production so far this year since Jan. 1 is 1,819,085, compared with 1,487,386 for the corresponding period of 1939. Operations for the second quarter are estimated at approximately 1,200,000 units.

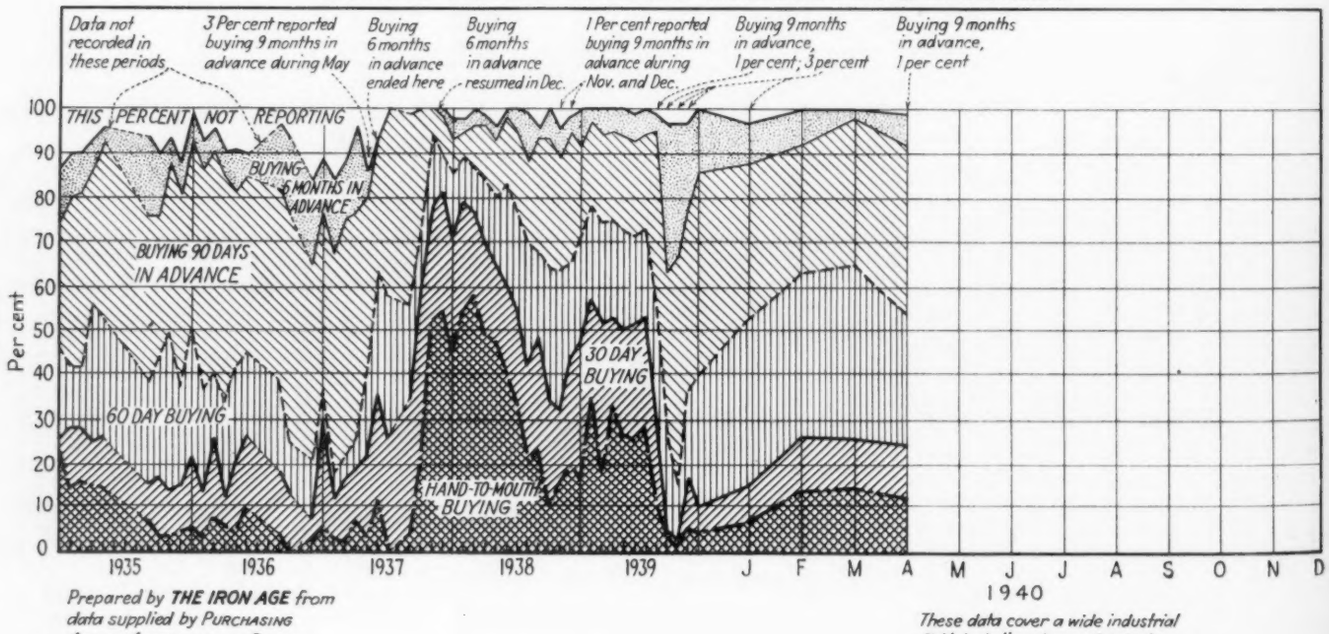
Some New Models by August

The 1940 model programs appear likely to reach their ends early in July, with June representing in many cases virtually the wind-up of production. Some plants are tentatively figuring on July 3 as the last working day on current models but the continued high level of sales may result in a fairly strong carryover after July 4 in many spots.

Earlier announcements for 1941 models are indicated by the National Automobile Show dates, which have been pushed forward about two weeks to Oct. 12-20. Probably the first showings of cars this year will come in August, which month was the general aim last year for many companies but only a few had cars ready before Sept. 1 because the most advanced group, General Motors divisions, suffered delays from the tool and die strikes of early summer. This year, at least three of four of the big companies should be ready in August and all will have models available by September. It has been indicated that a majority of manufacturers will conclude their previews before Sept. 15. Ford, usually later than the rest, probably will advance its schedule considerably.

Apropos of the Automobile Show, the industry received with surprise the announcement that Ford Motor Co. will participate in the 41st annual exhibit, and will participate in the drawing for space to be held here on May 9. In accepting an invitation

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT

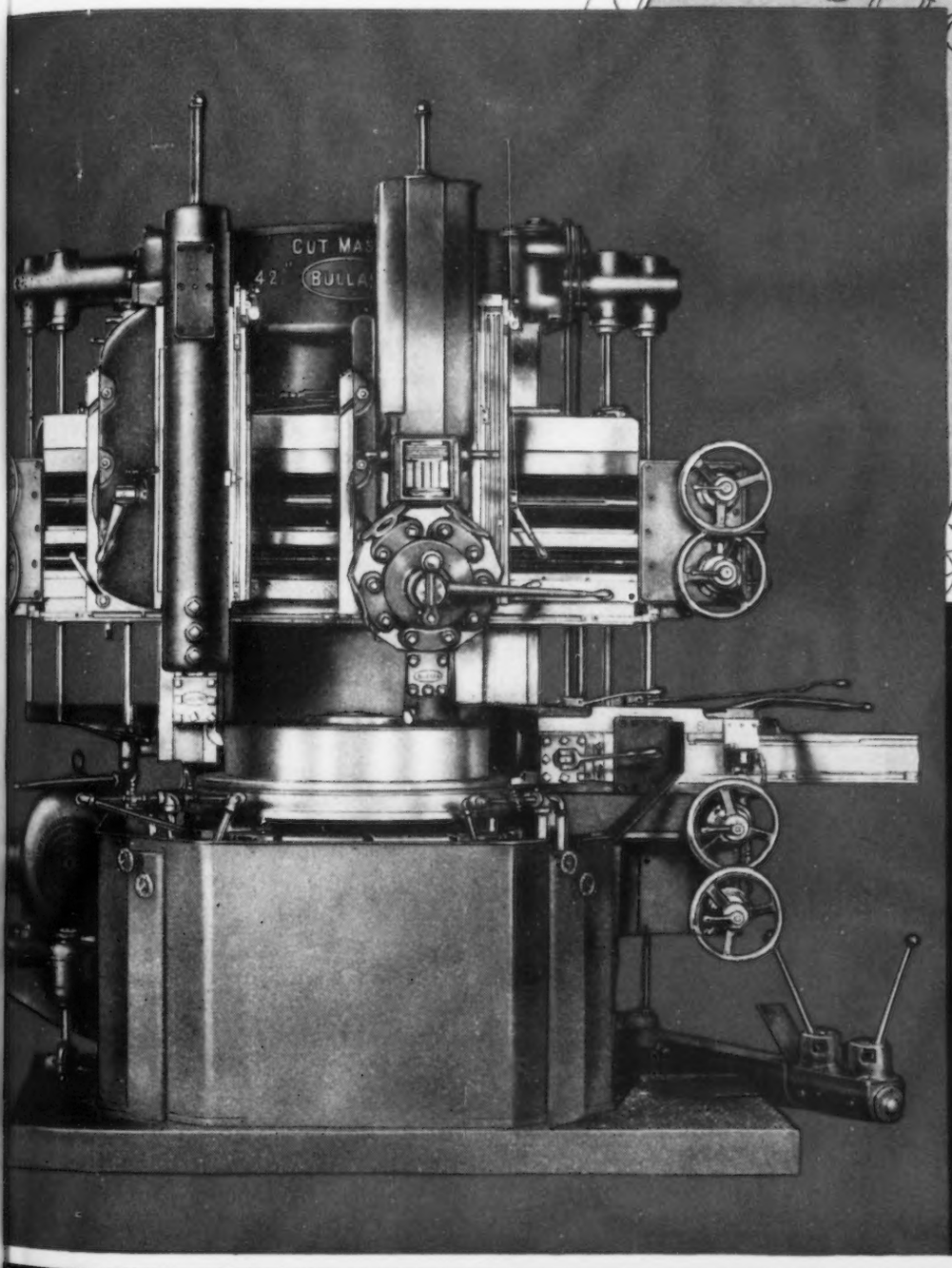


Prepared by ***THE IRON AGE*** *from data supplied by* PURCHASING AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory and auto plants

Insure THE BULLARD WAY

Operators are keen about Cut Master's stops, which control automatic feed kick-outs on all heads in all directions. These stops are *double insurance*—they prevent damage to the machine—and they protect against spoiled work. Send today for a bulletin covering *all* the features which make Cut Master such a tremendous advance in Vertical Turret Lathes.



This is a

42 INCH

CUT MASTER

VERTICAL TURRET LATHE

Also available in 30", 36", 54", 64" sizes with any combination of heads to suit your needs.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

from the Automobile Manufacturers Association to participate, the Ford company departs from its practice of holding an independent exhibit during show week. However, Ford's participation in the national show is not without precedent. The company took part in the 1935 exhibit, which was sponsored by New York dealers, and also participated in national shows in the industry's early years. A newer generation of automobile people almost forgets, but old timers recount the days before the settlement of the Selden patent suit when Ford participated in a series of national automobile shows along with other manufacturers, but not in the exhibits sponsored by the "licensed" builders of cars. After the Selden victory, which is a famous chapter of automotive history, Ford remained an independent exhibitor.

The outlook of industrial buyers in the Detroit area has widened considerably in the groups ranging from 60 days outward, although hand-to-mouth buying and 30-day buying remain virtually unchanged. The improvement, indicated in the April survey of the Purchasing Agents Association of Detroit, comes in an increase of 90-day buying and a gain in the six-month buying group. One per cent of the buying is reported to be based on requirements nine months ahead.

Largely, the gains are attributable to less buying according to the 60-day yardstick. The hand-to-mouth buyers decreased slightly in number and importance during the month but, as indicated on the accompanying chart, 25 per cent of the buying is still included within the 30-day range.

Concern over diminishing supplies of Swedish iron and steel is being widely expressed in the automobile industry, but the blow dealt by wartime conditions has been softened by the general conviction that domestic sources of supply will be able to take care of all requirements as soon as extra facilities can be provided.

Swedish steel has been almost exclusively used for automotive valve springs (except by Ford Motor Co.) and is used for some automobile clutch springs and a few other miscellaneous springs. Some manufacturers for several months have been using small quantities of domestic wire with varying degrees of success. Two strongly differentiated schools of thought have been uncovered by investigation. One holds to the viewpoint that when the supply of Swedish steel is curtailed, the automobile industry is up against a serious problem; although it does not state when the supply will be exhausted, this group infers that there is only enough material to last a few months. However, this group agrees with the opposed school of thought which contends that satisfactory domestic wire production exists and can be expanded in time to take care of all requirements.

As is generally known, Swedish steel is merely a high carbon steel but it is hard to duplicate because of the exceptionally pure raw materials found in Sweden and not in the United States. It is understood that Swedish steels are triple converted and are carefully processed and inspected to insure freedom from impurities and surface defects.

Segregations, inclusions and surface defects, particularly the latter, are harmful in springs and cause the failures which have resulted in exceptionally stiff demands for quality in automotive spring materials. Metallurgists assert that the handicap of lower grade ores in this country can be overcome by clean open hearth or electric furnace practice and by other precautions in manufacturing. Satisfactory steel has been made in this country for several months, mostly on a laboratory basis, it is true, with Swedish methods adopted as far as possible. It is anticipated, without undue over-confidence, that several suppliers will be providing the necessary steel for production by the time 1941 model runs are underway.

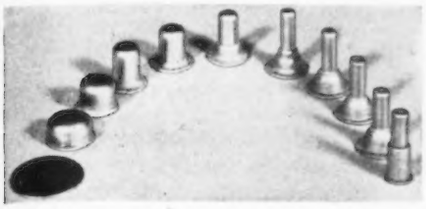
Some of the important metallurgists claim that the insistence on Swedish steel for valve and clutch springs is merely a fetish with some of their contemporaries. It is a state of mind which has been fostered in part by price considerations, they assert. They point to Ford's success with domestic high carbon wire as proof. On the other hand, design engineers attribute part of Ford's success with this material to the fact that the Ford engine has more room for valve springs than is allowed in some other designs. There are lower stresses and the material is not subjected to such extreme conditions, they declare. Among steels mentioned as successful candidates to replace the Swedish steels (in some cases small quantities of the substitutes are already being used) are a 6150 chrome vanadium and some carefully processed high carbon steels which are on the market.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

HERE, HERE! WHAT DOES THIS MEAN?
ASK HIM-- HE KNOWS! HE'LL TELL YOU ALL ABOUT IT-- I'M NOT TALKIN'!
WHY, THAT DUMB FAT-'HEAD! KICKIN' THAT KID RIGHT IN FRONT OF TH' BIG BOSS!
YEH, DUMB LIKE A FOX! HE SAW THE KID PUT A MOUSE IN HIS LUNCH BOX LAST WEEK BUT WAITED TILL HE SAW HIM WITH TH' BOSS, SO NO ONE CAN SAY HE'S A RAT, SQUEALER ER TATTLE TALE--TH' KID WILL DO HIS OWN SQUEALIN!
J.R.WILLIAMS 4-26
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE DIPLOMAT

Carboloy Sheet Metal Draw Dies Still Operating After 7,200,000 Pieces

An example of the service obtained from Carboloy sheet metal draw dies is illustrated in an application at a mid-western plant. As shown below, a steel ferrule is formed in 10 passes from blank to finished ferrule.



Carboloy cemented carbide dies are used for 8 of the 10 passes. Dies have been in use continuously since April 1937, have produced 7,200,000 pieces since that time and are still operating. Carboloy die sizes in use for sheet metal drawing range up to 6" I.D.

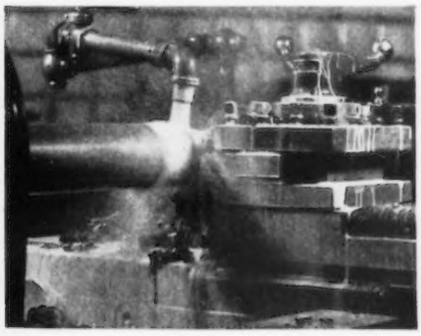
Many Uses For Carboloy In Form of Hollow Cylinders

Many industries having problems of rapid abrasive wear on localized areas of machine parts, tools, etc., have found numerous uses for Carboloy in the shape of hollow cylinders. A few of the many applications in use today are: Cam rollers, valve seats,

spindle bearings, ring gage and large plug gage inserts, workrest bushings, burnishing punch bushings, punch die inserts, etc. When requesting information, state sizes, probable quantities, type of job and finish required.

Carboloy Tool Removes 38 Cu. In. Per Min. On S.A.E. 2350 Spindle Job at Monarch

One of the 2000 Carboloy tool applications at Monarch Machine Tool Company is the turning of S.A.E. 2350 spindle forgings, 36" long, 4" diameter. Set up on a 20" Monarch lathe equipped with 30 H.P. motor,



a Carboloy tool turns this forging at 300 f.p.m., feed of .020" per revolution. Maximum depth of cut 5/8". The operation is completed in eight minutes, removing 38 cubic inches of metal per minute. High speed steel tools formerly required 24 minutes. The Carboloy tool completes five forgings between grinds.

Recent Carboloy Literature Bulletin GT-120 containing complete data on steel cutting with Carboloy tools. Booklet GT-403 describing the general purpose use of Carboloy tools on 1500 small-lot applications at Warner & Swasey Company.

MACHINING PRODUCTION SOARED 33% at MONARCH on 2,000 small-lot jobs . . .

Does it pay to use Carboloy tools for small-lot, diversified machining work?

Can you use Carboloy tools broadly throughout a plant for every-day-run-of-the-mine applications?

Ask Monarch!

In the Monarch plant you'll find Carboloy tools used as *general purpose* tools for 75% of all turning, facing, boring on cast iron and STEEL, and 100% of all end milling and face milling on cast iron and semi-steel.

Again!
General-Purpose Use of Carboloy *PAYS DIVIDENDS!*

Today, Monarch will tell you that Carboloy tools have stepped up machining production an average of more than 33%, and stepped down machining costs an average of 25% on more than 2,000 small-lot jobs in the Monarch plant.

How did Monarch get these quantity-production results on small-lot work? The method is surprisingly easy! It's a method *any* plant can use to increase production and reduce costs on diversified, short-run jobs. Write for the FACTS!

CARBOLOY COMPANY, INC., 11153 E. 8-Mile Blvd., DETROIT, MICHIGAN

CHICAGO • CLEVELAND • NEWARK • PITTSBURGH • PHILADELPHIA • WORCESTER, MASS.

CARBOLOY

REG. U. S. PAT. OFF.

TUNGSTEN CARBIDE—TANTALUM CARBIDE—TITANIUM CARBIDE

FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS
★ FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE ★

THIS WEEK IN WASHINGTON

. . . Congress, mindful of conventions, prepares for early adjournment . . . Possible Walsh-Healey Act exemptions studied by industry . . . Labor Board disavows staff member's slighting reference to Supreme Court Justice.

o o o

By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON — As a result of the Supreme Court decision upholding the minimum steel wage rates fixed by the Secretary of Labor, attention this week was being focused on Section 6 of the Walsh-Healey Public Contracts Act, under which the Secretary is empowered to grant exemptions from minimum wage and maximum hour stipulations if found "necessary and proper in the public interest." Members of Congress also were studying the decision in an attempt to measure its import in terms of the pending Logan-Walter bill which would subject many Federal administrative agencies to a uniform pattern of procedure and court review.

Section 6, which appeared to be the only avenue of relief remaining open to steel companies adversely affected by the steel wage order, provides:

"Upon a written finding by the head of the contracting agency or department that the inclusion in the proposal or contract of the representations or stipulations set forth in section 1 (provisions covering the minimum wage and maximum hour authority) will seriously impair the conduct of Government business, the Secretary of Labor shall make exceptions in specific cases or otherwise when justice or public interest will be served thereby.

May Permit Variations

"Upon the joint recommendation of the contracting agency and the contractor the Secretary of Labor may modify the terms of an existing contract respecting minimum rates of pay and maximum hours of labor as he may find necessary and proper in the public interest or to prevent injustice and undue hardship. The Secretary of Labor may provide reasonable limitations and may make rules and regulations allowing reasonable variations, tolerances, and exemptions to and from any or all provisions of this act respecting minimum rates of pay and maximum hours of labor or the extent of the application of this act to contractors, as hereinbefore described. . ."

While no definite assurances have been forthcoming from the Labor Department that exemptions would be granted, there are several factors which point to the likelihood of favorable disposition toward such requests. In the first place, the Labor Department has on several occasions reminded steel companies of the machinery provided under Section 6 and counsel for the Government has placed emphasis on this provision both in briefs and in oral arguments before the courts.

Second, there are indications that the War and Navy Departments would be favorably inclined to recommend relaxation of minimum wage stipulations in future contracts if specifically requested to do so by steel companies receiving contracts. Comparatively few industries, so far as the Navy is concerned, have been the subject of a minimum-wage determination under the Walsh-Healey Act. Hence, the steel wage order may give the Navy Department the first real pinch in its experience under Walsh-Healey minimum wage restrictions at a time when national defense purchases are at a peak.

Service Departments Opposed

Moreover, both War and Navy Departments, traditional protestants against the Congressional tendency to further restrict Government purchasing activities, are known to have been pleased with the result when the Circuit Court of Appeals enjoined the Secretary of Labor in March, 1939, and permitted steel companies to bid without regard to the steel wage order. Bidding on steel orders immediately went back to normal after the injunction was issued.

Officials, however, were apprehensive over the implications of the Court of Appeals decision in October, 1938, and to that extent can reasonably be represented as preferring that exemptions be granted through the machinery provided in the Walsh-Healey law rather than to allow the Circuit Court decision to stand.

The big three in the field of Government purchasing — War, Navy and Procurement — were understood to have been fearful that the lower court's decision would give prospective bidders unprecedented standing in court and that such bidders could tie up an entire purchasing program by seeking injunctive relief against what they might consider to be unfair or unduly restrictive specifications. The decision of the Circuit Court was of course reversed by the Supreme Court in its steel wage decision on April 30.

220 Purchasing Laws

The Supreme Court opinion, written by Justice Hugo Black, a member of the Senate when the Walsh-Healey Act was passed by that body, ruled that the courts must exercise a "hands-off" policy where Government purchasing activities are involved. The opinion critized the restraint placed upon the Secretary of Labor when the Circuit Court ruled last October in favor of the steel company litigants, but impliedly approved Congressional restrictions of Government purchasing activities. By actual count, there are over 220 separate statutory enactments, including the Walsh-Healey law, which Government purchasing departments must observe in awarding contracts.

That phase of the decision which ruled that the Walsh-Healey law is not subject to court review was understood to have prompted both sponsors and opponents of the pending Logan-Walter bill to appraise the pending measure in the light of the decision. Opponents reportedly were planning to amend the bill to include the Labor Department's Public Contracts Division with other agencies specifically exempted from the measure. On the other hand, sponsor of the measure may point to the decision as indicative of the necessity for specifically providing court review for parties allegedly

You'll like

THIS KIND OF MONOTONY!

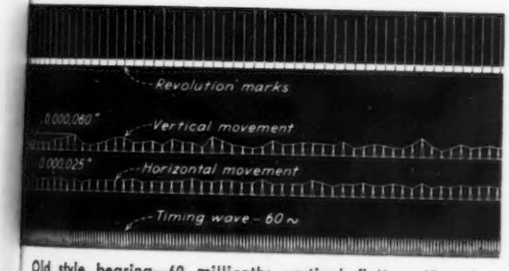
Grinding machines that run for years without ever having a spindle bearing breakdown may be monotonous to the inquisitive operator and the maintenance crew, but it's the kind of monotony you need for maximum grinding profits. Several years ago CINCINNATI developed a new and revolutionary type of grinding wheel spindle bearing for their grinding machines, and applied it first to chucking grinders. Results in better finish, more rapid metal removal and longer bearing life far exceeded expectations. (The original bearings are still running good as new.) Now, *all CINCINNATI Grinding Machines have these exclusive FILMATIC grinding wheel spindle bearings.

FILMATIC spindle bearings contribute these results to the already high over-all efficiency of CINCINNATI Grinding Machines:

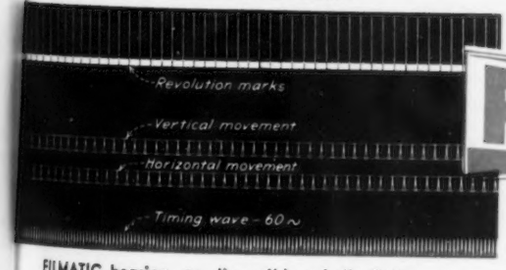
1. Practically eliminate grinding wheel spindle bearing maintenance . . . the chief cause of grinding machine down-time.
2. Reduce wheel truing and thereby lower wheel cost per piece.
3. No adjustment for varying grinding conditions as encountered when changing from roughing to finishing.
4. Spindle "flutter", a common source of "chatter", completely eliminated.

Investigate now the profit possibilities of CINCINNATI Grinding Machines equipped with FILMATIC bearings. A booklet describing these bearings, No. G-446, will be mailed on request.

*All grinding machines, manufactured by Cincinnati Grinders Incorporated, except the semi-special Nos. 5 and 6 Centerless, have FILMATIC grinding wheel spindle bearings.



Old style bearing—60 millionths vertical flutter; 25 millionths horizontal flutter.



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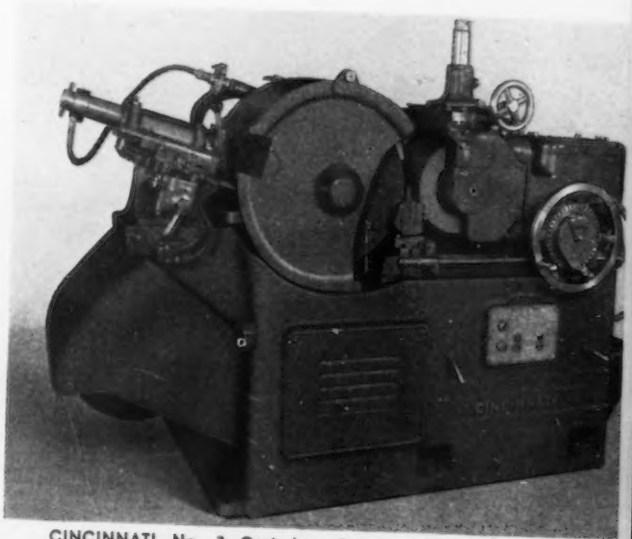

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aggrieved by any order of the Secretary of Labor under the Walsh-Healey law.

Some observers saw in the Black opinion a warning against broadening judicial supervision of administrative procedure, the primary objective sought in the pending Logan-Walter bill.

"The record here discloses the 'confusion and disorder' that can result from the delays necessarily incident to judicial supervision of administrative procedure developed to meet present day needs of Government and capable of operating efficiently and fairly to both private and public interests," the Black opinion said. ". . . The case before us makes it fitting to remember that 'the interference of the courts with the performance of the ordinary duties of the executive departments of the Government would be productive of nothing but mischief; and we are quite satisfied that such a power was never intended to be given to them.'"

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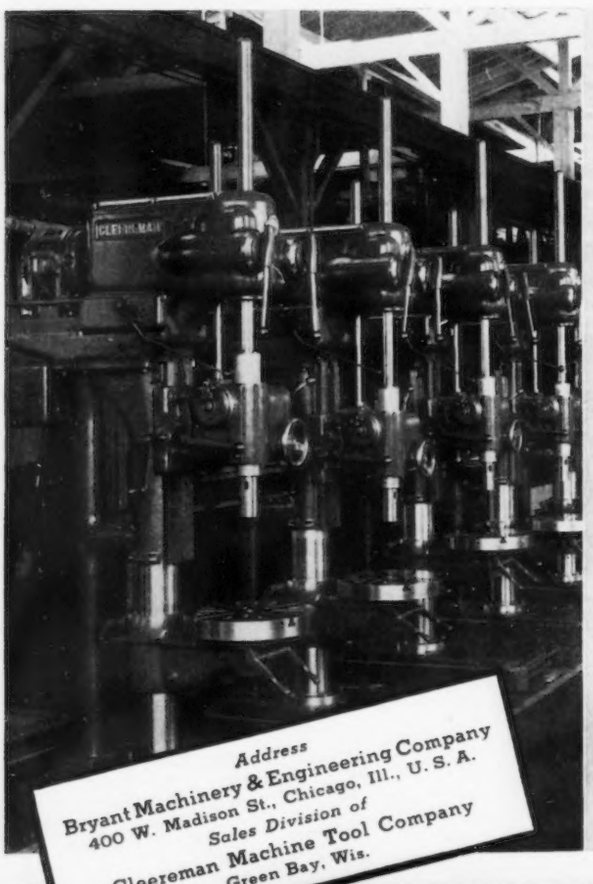

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NLRB Issues "Desist Order" Against Michigan Company

WASHINGTON—The National Labor Relations Board has directed the Premier Furnace Co., Dowagiac, Mich., to "cease interfering with its employees in the exercise of their rights of self-organization." Board Member William M. Leiserson dissented. The board dismissed the complaint in so far as it alleged that the company had discriminated against union members and had refused to bargain collectively with AFL's Local No. 409, International Molders Union.

"Where, as in this case, an employer has complied with the trial examiner's cease and desist recommendation and the board is not ordering him to do any more than that, I think it is bad policy to issue another cease and desist order thereafter," said Mr. Leiserson.

The board also has certified SWOC's Amalgamated Association of Iron, Steel and Tin Workers as the sole collective bargaining agency designated and selected by a majority of the production and maintenance employees of Electrogas Furnace Co., San Francisco, following a secret ballot election resulting in a count of 22 votes for the CIO union to eight for Bay Cities Metal Trades Council.

Strategic Materials For War Debts?

WASHINGTON—Senator Elbert D. Thomas, chairman of a Military Affairs sub-committee which considered the existing strategic and critical purchasing law, introduced a bill last week in the Senate which would direct the Treasury's Procurement Division to speed up war stock pile purchases and determine the extent to which materials could be acquired from foreign powers in payment of outstanding war debts.

The Procurement Division was recently given $3,000,000 additional to make purchasing of strategic materials for the remainder of the current fiscal year ending June 30.

Bar Rate Plea Denied

WASHINGTON—The Interstate Commerce Commission has denied a railroad application to establish rates of 34c. and 20c. per 100 lb. on reinforcing bars or rods, minimum 40,000 lb. from Kansas City, and Sand Springs, Okla., respectively to Denison, Tex., without observing the long-and-short-haul provision.

Congress, Mindful of Conventions, Ready for Early Adjournment

WASHINGTON — House action last week in killing proposed amendments to the Fair Labor Standards Act was believed to have set the current pace in Congress—to enact only necessary appropriation measures and perhaps a few other minor bills, preliminary to fixing an early adjournment date with all eyes on the summer political conventions.

Two sets of wage-hour amendments were voted down last week by the House. One sponsored by Representative Graham A. Barden, Democrat of North Carolina, would have exempted some 2,000,000 agricultural and other specified workers from the provisions of the wage-hour law. It was vigorously opposed by administration leaders.

The other set, sponsored by Chairman Mary T. Norton, of the House Labor Committee, consisted of "mild" amendments generally regarded as advanced by New Deal forces to head off the more "drastic" changes sought by various groups anxious to be exempted from the act. Administrative difficulties in interpreting certain sections of the wage-hour law have been cited as another reason for seeking clarification of the law.

Actually the House did not vote to throw overboard the two groups of amendments but its decision to send the bills back to committee was tantamount to killing them. The vote to recommit the Norton bill last Friday was 211 to 171—a count that was hastened because many members planned to rush off to the Kentucky Derby in Louisville.

The action in disposing of the wage-hour controversy may clear the decks for prompt consideration of Wagner Act amendments next week. The possibilities for passing even minor changes in the law, such as increasing the membership of the National Labor Relations Board as proposed by the AFL, are none too good but getting the wage-hour question and the Kentucky Derby out of the picture may help the House to regain its mental composure and be better prepared to consider the Wagner Act amendments on their merits.

Like the amendments proposed for the Fair Labor Standards Act, the Wagner Act amendments are divided into two groups—those proposed by the special House Committee investigating the NLRB and those sponsored by the House Labor Committee headed by Mrs. Norton. The revision recommended by the NLRB investigating committee, identified as the Smith amendments because they were introduced by Chairman Howard W. Smith, Democrat of Virginia, would among other things create a new three-man labor board; separate the board's prosecuting, administrative and judicial functions; and restrict the board's duties.

In addition to adding two members to the five-man labor board, Mrs. Norton's amendments would permit craft unions to determine their own bargaining units, allow employers to petition for elections when caught between the cross-fire of two rival unions, and insure for one year the operation of collective bargaining contracts.

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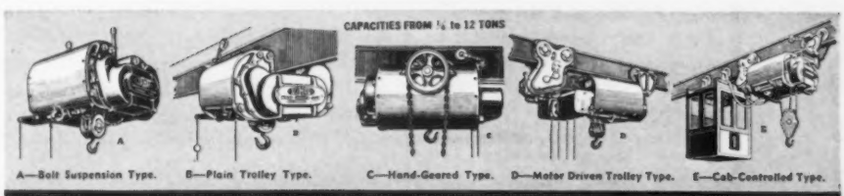

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NLRB Disavows Staff Member's Reference to Judge Roberts

WASHINGTON—Unfolded last week before the special House Committee investigating the National Labor Relations Board was a bizarre behind-the-scenes story of how a board staff member actively sought organized labor aid for a change in the composition of the United States Supreme Court whose members he referred to as nine old women, of his zeal in pressing for CIO unionization of the steel industry, and his slighting reference to Associate Justice Owen J. Roberts whose deciding vote on April 12, 1937, upholding the constitutionality of the Wagner labor act he said had been influenced by the CIO victories in the steel and automobile industries.

This tale was elicited through voluminous documents of Heber Blankenhorn, special NLRB investigator attached to the La Follette Civil Liberties Committee, and was presented by Committee Counsel Edmund M. Toland in the course of examination of Mr. Blankenhorn. Mr. Blankenhorn's reference to Justice Roberts, made in a note dated April 19, 1937, got the board into such a jam that it disavowed any responsibility for it. The memorandum was placed before the committee on Monday of last week.

His Own Opinions

"The NLRB dissociates itself from the supposition made by Heber Blankenhorn, a staff member, regarding the attitude of the Supreme Court and in particular the attitude of Mr. Justice Roberts, toward the five cases in which the Supreme Court upheld the validity of the act on April 12, 1937," said the board statement. "Immediately following the handing down of those decisions Mr. Blankenhorn set down observations on them which embodied nothing more than his own private opinions. These were never presented to the board or to members of the staff and would have remained unexpressed had they not been given currency before the special House Committee investigating the NLRB.

"The board regrets the publication of Mr. Blankenhorn's private suppositions and wishes to state that it was unaware of them until this morning."

In his memorandum, Blankenhorn said that "when Lewis (John L. Lewis, CIO head) in January convinced Morgan's he cast Roberts' vote." Mr. Blankenhorn testified that by "Morgan's" he referred to the United States Steel Corp. The note said the decision depended "essentially on one man, Roberts."

"The word of Philadelphia and New York to Roberts, whether spoken or to be inferred from the newspapers, was 'we have surrendered the nub of the Wagner act, we are in no position to fight on that line now, your decision might as well favor the act and at least save yourself'," the memorandum stated.

Blankenhorn Explains

By "surrender," Mr. Blankenhorn said he was referring to CIO contracts with the United States Steel Corp. and the General Motors Corp. The "surrender" he added, was due to CIO's economic pressure and its "reaching into the political field on the (Supreme) Court issue."

In a letter written on June 6, 1937, to Sydney Howard, a playwright, Mr. Blankenhorn told how hard the latter had been trying to get the American Federation of Labor and John L. Lewis to assist in bringing about a change, through a constitutional amendment, in the composition of the Supreme Court, a move that President Roosevelt himself attempted shortly after his reelection in that year only to meet a disastrous defeat at the hands of Congress.

"Meanwhile I am most anxious to see all emphasis shifted from the political to the economic field," Mr. Blankenhorn told Mr. Howard. "So have been mixing in to plans for steel organization, which as you see took a mighty step forward. Steel is the place for all good men to come to the aid of their party." Continuing, Mr. Blankenhorn said:

"The threat of the guillotine and the nine old women on Capitol Hill has the opposite of any terrors for me. And I am as noble as Sidney Carton (character in Dickens' 'Tale of Two Cities' who was guillotined). In short, the policy I have advocated for the National Labor Relations Board is that its duty is to join the suicide club. So we have done our darndest to be guillotined this year along with the rest of the alphabet, instead of next winter, but instead we are condemned to live."

Pressure on Amalgamated

"Not only am I for a constitutional amendment and have tried hard at the AFL convention and with John L. Lewis to get labor committed to it

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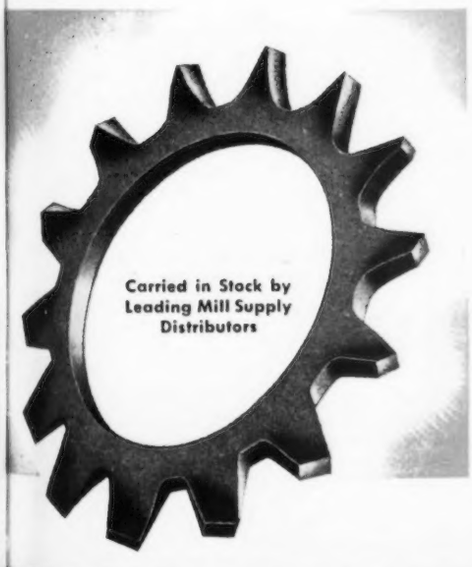

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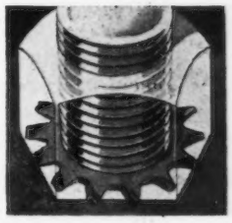

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now, but it seems to me that the principal job of this board and of the La Follette committee investigation, should it be set up, is to clarify the country's mind in regard to the constitutional crisis. The bottom of that crisis is capital-labor relations."

"Did you mix in union activities in behalf of the CIO while you were on the payroll of the Government?" demanded Mr. Toland.

"I did not," replied Mr. Blankenhorn.

"Are you telling the truth now or when you wrote the letter?"

"I have always tried to tell the truth," Mr. Blankenhorn answered.

In a letter of May 20, 1936, to Clinton S. Golden, then board regional director at Pittsburgh, but regional director since June 12, 1936, of the Steel Workers Organizing Campaign, Mr. Blankenhorn said that Philip Murray, SWOC head, and CIO vice-president; CIO National Director John Brophy and Pat Fagan, United Mine Workers official, had conferred with Secretary Louis Leonard of the Amalgamated Association of Iron Steel and Tin Workers, then an AFL union. Mr. Murray, the letter said, "did some plain talking, and Mr. Brophy thought it would be a good idea if I (Mr. Blankenhorn) would try to put some pressure on Leonard for action—" seeking Amalgamated's cooperation in organizing the steel industry.

In another confidential letter, dated May 26, 1936, Mr. Blankenhorn told Clarence Irwin, "rank and file" steel leader, that Mr. Lewis was "disgusted" with the attitude of AFL steel union officials regarding cooperation for organizing the steel industry.

"Mass Charges" Mentioned

After a CIO-AFL agreement to organize the industry, Mr. Blankenhorn, according to a letter he wrote to the board, was in Pittsburgh and was asked by Mr. Murray and Mr. Golden respecting the possibility that the board would consider "mass charges" against steel companies for alleged interference with the right of employee organization.

Subsequently SWOC filed charges with the board against the Carnegie-Illinois Steel Corp., and in a letter of Jan. 7, 1937, to the board, Mr. Blankenhorn said that Board Attorney Gannett Patterson inquired about calling Mr. Lewis to the stand. Mr. Blankenhorn said that he suggested that Mr. Lewis be held in reserve to be called after Benjamin F. Fairless, then president of the Carnegie-Illinois Steel Corp., and Arthur Young, then vice-president in charge of personnel of the United States Steel Corp.

The letter quoted Mr. Lewis as doubtful of the advisability of such action unless he could go after some "really big fellows." Mr. Blankenhorn said the "big fellows" he hoped to see before the La Follette Committee were Myron C. Taylor, then Steel Corporation chairman, and Mr. Lewis but that since that was not predictable, he suggested that if Mr. Young responded to a board subpoena, the latter might "with good reason want to hear from Lewis as an expert witness."

Checks Sentiment of CIO

Mr. Blankenhorn also kept a check for the board to see what the CIO sentiment was toward it. Following a CIO meeting in Atlantic City, Mr. Blankenhorn reported to the board on Oct. 18, 1937, that it would be "very much of a mistake to underestimate the

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feeling against certain board decisions." He went on to say that criticism by CIO leaders was part of their fight with the AFL.

"They saw themselves throwing brickbats through the board's plate glass windows straight at Bill Green," said Mr. Blankenhorn, referring to AFL's president.

Things looked more comfortable after the CIO convention in Pittsburgh one year later, according to Mr. Blankenhorn, who reported that having made "many private inquiries along the line," he found that the attitude of delegates to the board "was of sweeping support and continuous praise."

Unconsciously or otherwise, Mr. Blankenhorn conceded that the CIO felt a proprietary interest in the board and the Wagner act.

"In short," Mr. Blankenhorn added, "the CIO sentiment is that if anybody is going to save the law and the board it is the CIO and they are organizing to do so. You would think the law was their personal possession. The decisions reinstating large numbers of men with back pay are what the delegates talked about."

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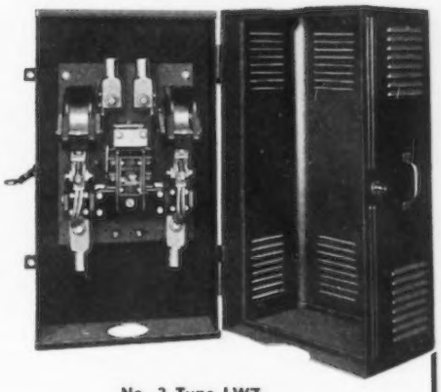

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Government Orders

WASHINGTON — Government contracts for iron and steel products, as reported for the week ended April 27 by the Labor Department's Public Contracts Division, totaled $732,845. Also reported for the same period were contracts aggregating $264,494 for nonferrous metals and alloys; and $1,324,013 for machinery. Details follow:

Iron and Steel Products

American Car & Foundry Co., New York, War Engineer Corps, pontoon bridge equipment	$247,390
Tophams, Inc., Washington, War Engineer Corps, pontoon bridge equipment	41,128
Virginia Bridge Co., Roanoke, Va., War Engineer Corps, loading bridges	22,616
Peco Mfg. Corp., Philadelphia, War Ordnance, nose plugs	23,287
United States Pipe & Foundry Co., New York, War QMC, cast-iron water pipe	12,541
Stevens Walden, Inc., Worcester, Mass., War Ordnance, rifle barrels	23,622
Oliver Iron and Steel Corp., Pittsburgh, War Ordnance, eyebolt lifting plugs	37,216
Whitehead and Kales Co., Detroit, TVA, gate anchorages	38,010
MacWhyte Co., Kenosha, Wis., Philadelphia Navy Yard, tie rods	32,100
Warren Webster and Co., Camden, N. J., War Ordnance, booster, components	34,656
Simonds Saw and Steel Co., Boston, Navy Purchasing Office, saw blades	14,027
Chrysler Corp., Detroit, War Ordnance, shell forgings	67,732
Chrysler Corp., Detroit, War Ordnance, machined shell	110,616
Troy Chain Co., Troy, N. Y., U. S. Coast Guard, buoy chain	14,150
James B. Clow & Sons, Chicago, WPA, cast iron water pipe	13,750

Non-Ferrous Metals and Alloys

Philco Corp., Philadelphia, War Ordnance, fuzes, components	$133,485
Chase Brass & Copper Co., Waterbury, Conn., Boston Navy Yard, copper tubing	15,318
John A. Roebling's Sons Co., Trenton, N. J., Panama Canal, copper wire cloth	13,699
Fulton Sylphon Co., Knoxville, Tenn., War Ordnance, fuzes, components	101,991

Other Machinery

American Water Softener Co., Philadelphia, War Engineer Corps, water purification units	$25,760
Sullivan Machinery Co., Michigan City, Ind., War Engineer Corps, Air compressors	328,046
Galion Iron Works & Mfg. Co., Galion, Ohio, War Engineer Corps, road graders	35,937
Reed-Prentice Corp., Worcester, Mass., War Engineer Corps, band saws	58,080
Ingersoll-Rand Co., New York, War Engineer Corps, circular saws	21,636
Caterpillar Tractor Co., Peoria, Ill., War Ordnance, tractors	168,629
Henry Prentiss & Co., Inc., New York, War Ordnance, boring mills	108,556
Consolidated Supply Co., Portland, Ore., Puget Sound Yard, valves	13,407
The Seifreat-Elstad Machinery Co., Dayton, Ohio, War Air Corps, milling machines	43,860
Consolidated Machine Tool Co., Rochester, N. Y., War Ordnance, reconditioning planer	17,985
The Unipress Co., Inc., Minneapolis, War QMC, laundry machinery	19,712
The American Laundry Machinery Co.,	

Cincinnati, War QMC, laundry machinery	11,677
McKiernan-Terry Corp., New York, Philadelphia Navy Yard, hoisting winch	24,047
Tacoma Plumbing Supply Co., Tacoma, Wash., Puget Sound Yard, valves	14,257
Fairbanks Co., New York, Puget Sound Yard, valves	11,197
Southwest Welding & Mfg. Co., Alhambra, Cal., WPA, scrapers, rippers	10,970
Hanson-Van Winkle-Munning Co., Matawan, N. J., Navy Purchasing Office, plating unit	15,996
Huber Mfg. Co., Marion, Ohio, Panama Canal, road rollers	12,614
Allis-Chalmers Mfg. Co., Milwaukee, War Ordnance, tractors	355,164
Wilson-Weesner-Wilkinson Co., Knoxville, Tenn., TVA, tractors	26,480

Cable Contracts Awarded

WASHINGTON—Contracts for cable have been awarded by the Bureau of Supplies and Accounts, Navy Department, as follows:

The Okonite Co., Passaic, N. J., $13,527; Collyer Insulated Wire Co., Pawtucket, R. I., $7,211; Rockbestos Products Corp., $7,269; National Electric Products Corp., Pittsburgh, $14,007; Anaconda Wire & Cable Co., $13,845; and the Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Division, New York City, $7,795.

C. of C. Strikes at Defeatism, Finds America a "Young" Nation

WASHINGTON—Rated first of the 26 resolutions adopted by the Chamber of Commerce of the United States at the close last Thursday of the annual meeting was one which struck directly at the widespread defeatist doctrine. To the preachment of a "finished America," the resolution, endorsing a note sounded to 1500 delegates throughout the meeting, said that invention and research should be encouraged, that new products, new uses and new industries may appear in ever-widening progression.

Production, it was pointed out, should be recognized as the only source of abundance, of lower prices, of wider distribution in the use of products and of higher wages and increased employment. For production that will grow and bring these benefits, it was declared, all of the facilities and equipment that capital-goods industries can supply are needed, and free access to the markets for all enterprises that show their worthiness.

Related to this resolution was one dealing with capital markets. Declaring that the normal processes of saving and investment should again be encouraged, the resolution said that increased private investment would make unnecessary much of the huge expenditures of federal, state and local governments for relief, public works "and other depression undertakings."

In addition to resolutions criticizing the New Deal's spending policy, and urging a cut in expenditures, other resolutions attacked the size of the enormous government debt, and said its limit should not be increased; urged revision of the Wagner labor and wage-hour acts; assailed the "easy" money policy and high taxes and declared that the judicial and administrative functions of federal agencies should be separated. The resolution proposing amendment of the National Labor Relations act said that there should be written into the law mutuality of obligations between management and employees. Enactment of the Smith labor bill at the present session of Congress was urged.

Calling national defense the most important question in the United States today, a resolution urged that further armament be expedited and said national defense should be carried on a pay-as-we-go basis. Congress, it was stated, should reaffirm its determination to keep the United States out of war, "unless our nation is endangered."

James Scott Kemper, Chicago, president of the Lumbermen's Mutual Casualty Co., and of the American Motorists' Insurance Co., was elected president of the Chamber.

America Still Young—Wilson

Progressive America faces the future with firm faith in the continuing dynamic destiny of a still young America, the convention was told by Charles E. Wilson, president, the General Electric Co., who took sharp issue with the present widely-preached philosophy of a finished America under the free enterprise system.

"This is a dark cloud of defeatism which must be cleared away before the future may be precisely planned," said Mr. Wilson. "It is, in fact, the freezing cloud which is benumbing the

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● Hannifin spring return valve gives instant return of the cylinder upon release of the foot pedal and is especially adapted to operation of arbor presses, riveting presses, and similar air operated equipment. Operators find simpler control increases production, and leaves both hands free for other work. Write for Valve Bulletin 34-A with complete information on all types—hand and foot operated, manifold, rotary and electric models.

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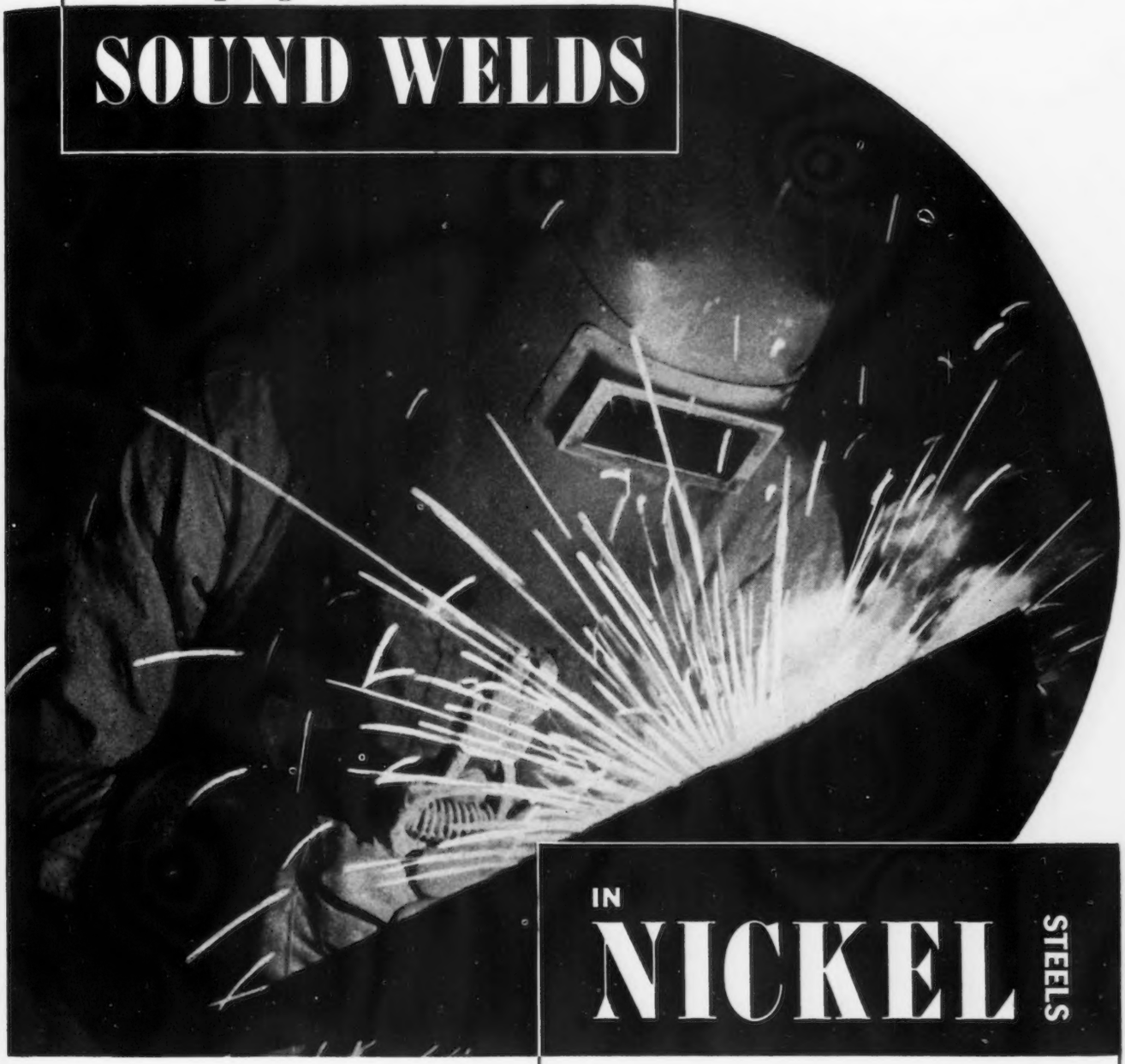

IN

NICKEL STEELS

PRODUCING pressure vessels to meet A. S. T. M. specifications, Black, Sivalls & Bryson, Oklahoma City, says, "Provided only that simple necessary precautions are used in fabricating, 2½% Nickel steel pressure vessels can be welded with complete success at the same speed as mild steel, with greatly improved strength, safety and durability in the completed structure." With Murex 2¼% Nickel Steel electrodes, smooth, sound welds are made in 2½" thick 2.00/2.75% Nickel low carbon plates used in fabricating 24' accumulators.

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free cooperative interplay of all of our constructive forces—and hence, it confounds us."

He said that notwithstanding the discouragements of the past decade, invention, research and refinement have gone forward and that as they have done so, they have made obsolete much of the machinery in use before the depression. It was declared that it may be said "with certainty that, in the electrical industry alone, millions of man hours of work await only the return of the intangible but indispensable element of confidence to be released."

Beyond the field of slum clearance activities in which government undoubtedly has a place—there lies before free enterprise the much larger opportunity of providing America's millions with modern homes at a cost within their means," said Mr. Wilson.

"Of course, hundreds of other opportunities lie before us, but these three—the modernization of industry and of public utility properties, and the application of modern techniques to residential building—are specifically mentioned because, through these three activities, alone, prosperity can be reestablished without waiting for new invention.

"And what lies before us in the great field of research and invention to which progressive American industry is devoting hundreds of millions of dollars and the intelligence of thousands of brilliant minds?

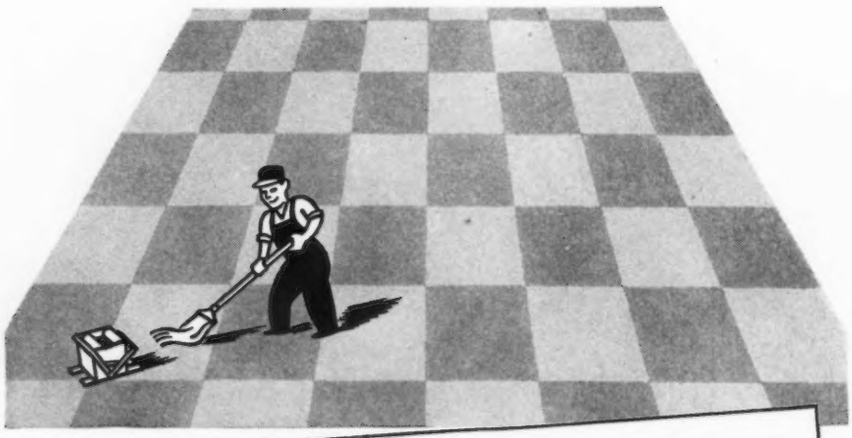
"Obviously, it is difficult to definitely predict, but of this we may be sure. Never before has there been so much knowledge—so much eager, public-spirited effort—so much money applied to the search for new services as there is today—and, therefore, at no time has there been a better prospect of finding new services than there is today."

Defeatism also was attacked by S. Wells Utley, president and general manager of the Detroit Steel Castings Co., Detroit. He said just as a half century ago, government proclaimed that the world was finished, so today government is again making the same prophecy.

"Time has proved that the first one was a fallacy and, assuming that we continue under the same principles of free enterprise as have guided us in the past, there is no reason to think that the second prophecy is not likewise erroneous," said Mr. Utley.

"When we realize that for the first time in American history a decade has closed with a lower national wealth and a lower national income than that with which the decade commenced, when we realize that during that decade practically every change has been one which tended to reduce the stipulation of the production of useful pictures in the human mind, shall we blame our lack of progress upon the failure of God's laws, or upon interference with them on the part of deluded human beings?" Mr. Utley asked.

Walter Harnischfeger, president, Harnischfeger Corp., Milwaukee, said that national labor laws should be materially and promptly modified; that there is a widespread belief among business leaders that taxes have reached the saturation point and that reduction in government waste and expenses is paramount to bring about a sustained prosperity. He declared that some form of trade agreement should be continued for the disposal of surplus products in export markets and that to the same end some method of rediscounting export papers under an



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Your local Wyandotte Service Representative will help you get similar results with any of *your* problems—such as cleaning steel, die cast, or brass prior to bright nickel, or cleaning strip stock for tinning.

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SERVICE REPRESENTATIVES IN 88 CITIES
THE J·B·FORD SALES CO· WYANDOTTE MICH·

insurance plan which will pay for itself should be developed.

"The ability to secure additional capital for the expansion of private enterprise is a very important factor to bringing back normal conditions, and will only be revived, in my opinion, by a reduction in government interference so that it is again possible for business to produce reasonable earnings," said Mr. Harnischfeger.

He urged development of a national defense program over a 10-year period so that industry can be stabilized and does not again as it did during the first World War over-expand capacity and later on have to shrink it at a terrific cost. "I believe we should expand our peacetime industries, our home building, our utilities, our merchant marine, and our commercial air transportation and modernize our railroads," Mr. Harnischfeger said. "This will bring a healthy and sustained prosperity."

Solution of the tax problem lies in the adoption of a permanent revenue system from which no departure would be permitted, said Ellsworth C. Alvord, of Washington. Mr. Alvord declared that annual tinkering and emergency levies can be obviated if Congress attacks the problem through the creation of budget committees of each house.

Standards Revised for Enameled Cast Iron Ware

WASHINGTON—A revision of commercial standards for sanitary cast iron enameled ware has been approved by the Division of Trade Standards of the Bureau of Standards and will become effective for new production on and after May 25. Recommended by the Sanitary Cast Iron Enameled Ware Association, the revised standards cover specifications for material, thickness, warpage, enameling, acid-resistance, inspection rules and marking. The standards already have been approved by interested parties. Adherence will be voluntary in accordance with the usual procedure outlined by the Bureau of Standards.

Body of C. M. Schwab is Moved to Loretto, Pa.

THE body of Charles M. Schwab, steel master who died last year, has been moved from a cemetery in Westchester County, N. Y., to Loretto, Pa., to be buried beside his parents, John and Pauline Schwab.

U. S. Awards Contracts For 2104 Tons of Tin

WASHINGTON—Award of four contracts for an aggregate of 2104 net tons of pig tin has been made by the Procurement Division as follows:

Caswell, Strauss & Co., New York, 1120 tons at 46.93c. per pound, total $1,051,232, subject to a one-half per cent discount, 20 days; Wah Chang Trading Corp., New York, 100 tons at 46.75c. per pound, total $93,500; C. S. Trench Co., New York, 784 tons at 47.20c. per pound, total $740,096, subject to a one-half per cent discount, 20 days; American Metal Co., Ltd., New York, 100 tons at 47.50c. per pound, total $95,000. This latter award is contingent upon the contractor furnishing Amco brand tin smelted in this country from Bolivian ore. The ore to be supplied by the other contractors listed is of Oriental origin. Delivery must be made within six months.

THE Hiawatha MUST MAKE ABOUT 4285 TRIPS FROM CHICAGO TO THE TWIN CITIES • •
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TO EQUAL THE 30,000 HOURS SERVICE BUILT INTO THIS NEW DODGE-TIMKEN BEARING
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*THE 30,000 HOUR LINE OF DODGE ROLLING BEARINGS

Industrial Machinery Exports Are Second Heaviest on Record

WASHINGTON—Increasing to the second highest monthly figure ever recorded and exceeded only by the December, 1920, shipments, United States exports of industrial machinery in March totaled $37,559,841, a 27 per cent gain over the corresponding shipments in March, 1939, valued at $29,594,195, according to the Machinery Division, Department of Commerce. Practically all major types of equipment exported shared in the increased trade, except petroleum well-drilling and refining machinery in which sales continued lower than in the corresponding month of last year.

Totaling $3,223,837, construction and conveying equipment exports in March were 76 per cent greater than a year ago when these shipments amounted to $1,827,541. Valued at $2,119,230, March exports of power-generating equipment, except electric and automotive, showed little change from the March, 1939, trade which amounted to $2,099,629. Foreign sales of petroleum well and refining equipment continued at reduced levels during the month, causing total shipments abroad in the mining, well, and pumping equipment group to drop below those a year ago, $5,245,434 against $6,259,655.

Expansion Not General

March exports of power-driven metal-working machinery reached the record monthly value of $18,267,473, representing a 51 per cent improvement over the March, 1939, shipments which totaled $12 057,012. The expansion was not distributed over all items in this group, large increases being registered in some types and declines in others. Exports of thread-cutting and automatic screw machines were more than five times those in March of last year, $1,761,598 against $313,067, while shipments of lathes advanced to almost three times those a year ago, $3,366,517 against $1,349,533. Other increases included vertical boring mills and chucking machines, $797,520; gear cutters, $735 039; vertical drilling machines, $329,164; radial drilling machines, $289,428; planers and shapers, $473,904; surface grinders, $550,668; internal grinders, $920,403; tool, cutter, and universal grinders, $856 532; sheet and metal-working machines, $543,580, and forging machinery, $805,763. Smaller shipments were made of knee and column type milling machines, $740,759; other milling machines, $1,185,203; external cylindrical grinders, $379,553; rolling-mill machinery, $1,414,317, and molding machines, $45,377.

March exports of metal-working machinery, exclusive of the power-driven type, were 162 per cent greater than in March, 1939, totaling $902,889 compared with $344,327. Exports of pneumatic portable tools accounted for most of this increase, shipments abroad during the month totaling $466,856 compared with $101,790 a year ago.

March exports of textile, sewing and shoe machinery amounted to $2,291,923 compared with $1,700,714 in March, 1939. American textile machinery exporters continued to expand their shipments abroad, their foreign sales during the month amounting to $1,233,464, a 48 per cent increase over the trade a year ago valued at $831,194.

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Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

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Swedish Iron Ore Vital to Germany

FIGURES of German imports of iron ore in recent years, issued by the Ministry of Economic Warfare, show that in 1938 Germany (the old Reich) imported 21,928,000 tons of iron ore with a total iron content of 11,342,000 tons, says an article in *The Iron and Coal Trades Review* of Great Britain. The article continues:

"Of this total, 9,730 000 tons, with an iron content of 4,467,000 tons, was imported from countries to which Germany ceased to have access immediately on the outbreak of war (*i.e.*, France, Newfoundland, Spain, Algeria, Spanish Morocco, Sierra Leone, French Morocco, Tunis, Brazil and others). The balance came from countries to which Germany continued to have access after the outbreak of war, as shown in table.

German Imports of Iron Ore in 1938 from Countries Still Accessible after September 3, 1939.

	Iron Ore Met. Tons	Iron Content Met. Tons
Sweden	8,992,000	5,480,000
Luxemburg	1,718,000	515,000
Norway	1,118,000	726,000
Greece	249,000	120,000
Switzerland	121,000	34,000
	12,198,000	6,875,000

"Sweden's total exports of iron ore to all destinations amounted to 13,964,627 tons in 1937 and 12,685,151 tons in 1938. This total was shipped through the ports shown in the following table:

Ports of Shipment of Swedish Ores in 1937 and 1938

	1937 Met. Tons	1938 Met. Tons
Narvik	7,580,000	7,605,000
Lulea	3,103,216	2,853,000
Oxelosund	2,144,632	2,190,000
Other Baltic ports	625,489	*

*Not available.

"Allowing for certain discrepancies in these figures, it may be taken that the maximum quantity of iron ore shipped from Swedish Baltic ports amounted to 6,385,000 tons in 1937 and 5,080,000 tons in 1938.

"In estimating present-day Germany's requirements, it is also necessary to take account of Polish and Czechoslovak imports of iron ore from Sweden. Swedish recorded exports of iron ore in 1937 and 1938 were: Germany, 9,459,378 and 8,945,115 metric tons respectively; to Czechoslovakia, 761,721 and 798,180 tons; and to Poland, 111,489 and 126,882 tons, making totals of 10,332,588 and 9,870,147 tons. It will be noted that the total of these three countries' imports from Sweden included substantial shipments via Narvik, and in any case greatly exceeded in both 1937 and 1938 the quantity shipped through Baltic ports.

"In view of the fact that Germany, on the outbreak of war, was automatically cut off from well over a third of her former imported supplies, it is clear that the Swedish, and to a lesser degree the Norwegian, supplies have since been to her of greater importance than ever in the past. Moreover, it is obvious that Germany will be ready to import every ton that Sweden is prepared to ship through Baltic ports, and the denial to her of the balance of her imports from Sweden, hitherto shipped through Narvik, as well as of her imports of ore from Norway, represents a further substantial net loss to her of a commodity in which she is already seriously deficient."

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PETROLEUM PRODUCTS FOR ALL INDUSTRIES
PHOTO COURTESY JOHN P. MUDD

Loss of Narvik Ore Supplies Will Hit German Steel Trade

LONDON—The German steel industry has been deprived of about one-fourth of its total ore supplies by the British occupation of Narvik. The loss is even greater than this, as it must have the high grade Swedish ore to mix with its own low grade product to permit the operation of the basic Bessemer process, which is the foundation of its steel industry in normal times.

British steel authorities consider that since the war commenced the total effective iron-making resources of Germany have been cut by at least half. The Germans would appear to have only one way of countering the blow at Narvik, apart from extending the war to Sweden, and that is by the ruthless collection of scrap, even to the point of disorganizing general industry by lifting secondary railroad tracks and dismantling structures.

The British position, on the other hand, is very different. The temporary stoppage of ore shipments from Narvik affected only 10 per cent of British supplies, and the United Kingdom, having its other pre-war sources of supply intact, can obtain alternative shipments. Moreover, considerable tonnages of scrap can easily be recovered in Britain without disturbing productive industry. It is pointed out the melting of a ton of scrap yields enough steel to build three gross tons of shipping.

Another penalty of the war for Germany was the immediate severance of her second largest ore supply—5,000,000 tons annually from Lorraine. Further, the mineral which she formerly imported from Newfoundland, North Africa and Spain is no longer available to her. Thus, if the loss of 9,000,000 tons of Swedish ore is added to the disappearance of the other sources of supply, there must follow a reduction in Germany's steel output of no less than 8,000,000 tons, allowing for the iron content of the various materials. That is a serious slice out of a total production immediately before the war of 26,000,000 tons.

To make up the shortage Germany must rely on the great steel mills built at Brunswick, North Germany, and Linz, Austria, which consume local low grade ores and coke transported from a distance by rail and canal. Of the 20 blast furnaces scheduled at Brunswick, however, it is believed that only eight are so far in operation, and the entire plant will not be completed before 1941. The ore which it is here hoped to substitute for imported ores averages less than 30 per cent iron content. This does, of course, take considerably longer to smelt and uses far more coal. Relying on the substitution of the domestic ore, it will take Germany several years to recover steel production by building the special plant which alone can handle this mineral.

Recent figures suggest that Germany's reserves of iron and steel scrap are nearing exhaustion. She is therefore having to meet the growing scrap shortage with a greater proportion of pig iron, and this again calls for more ore. Denied both scrap and ore, it is impossible for her to produce her rising steel requirements.

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U.S. Steel Pushing Sales Abroad, Stettinius Says; Operations 63.1%

OPERATIONS of United States Steel Corp. subsidiaries are averaging 63.1 per cent, compared with 43.3 per cent at this time last year, and 29.9 per cent two years ago, Edward R. Stettinius, Jr., told the corporation's stockholders at the annual meeting at Hoboken, N. J., on May 6.

Shipments of rolled and finished steel products in the first quarter of 1940 were 3,085,000 net tons compared with 2,460,000 tons in the corresponding period of 1939, an increase of 625,000 tons or about 25 per cent, the corporation's chairman said. Of first quarter shipments exports accounted for 462,000 tons. Exports for the last four months of 1939 amounted to 582,000 tons, and for the first eight months of last year 705,000 tons.

While exports last year totaled 9 per cent of total tonnage shipped, the amount shipped abroad so far this year is around 13 per cent, Mr. Stettinius told the U. S. Steel stockholders. "It is noteworthy," he said, "that a considerable part of the increase in our export business is not traceable to direct war needs, but is due to diminishing competition from foreign sources in neutral countries as a result of the war." The corporation's merchandising efforts abroad "have been expanded and intensified," and may account for a portion of the increased tonnage abroad, he said.

No Expansion for War

The Steel chairman said the corporation is not planning to alter or enlarge its facilities for war business. If the company received orders for all of the steel required this year in the Government's naval armament program, the tonnage would amount to only one per cent of last year's finished steel production, the stockholders were told.

Questions by stockholders brought from Mr. Stettinius statements that steel prices could not profitably be discussed at the meeting, that the corporation is not planning to proceed with establishment of a steel plant in Brazil, and that no predictions could be made as to future dividends on common stock. The corporation "must remain competitive," he told the stockholders.

One effect of the war, Mr. Stettinius said, has been a slight decline in foreign stockholders from 4118, holding 76,931 shares, at the war's outset, to 4060, holding 74,152 shares on April 8, when Germany invaded Denmark and Norway.

Nineteen forty finds U. S. Steel marching ahead to new standards of effectiveness, the Steel chairman said. He reported that shipments of stainless steel by his company have increased 600 per cent since 1932 and that the company since that year has risen from tenth to third in stainless capacity. The stockholders were told that the corporation's costs have advanced faster, without corresponding price advances, than technological savings, and that its tax bill ($67 millions in 1939) has become a serious factor in production and marketing.

Engineering highlights in the corporation's producing, shaping and

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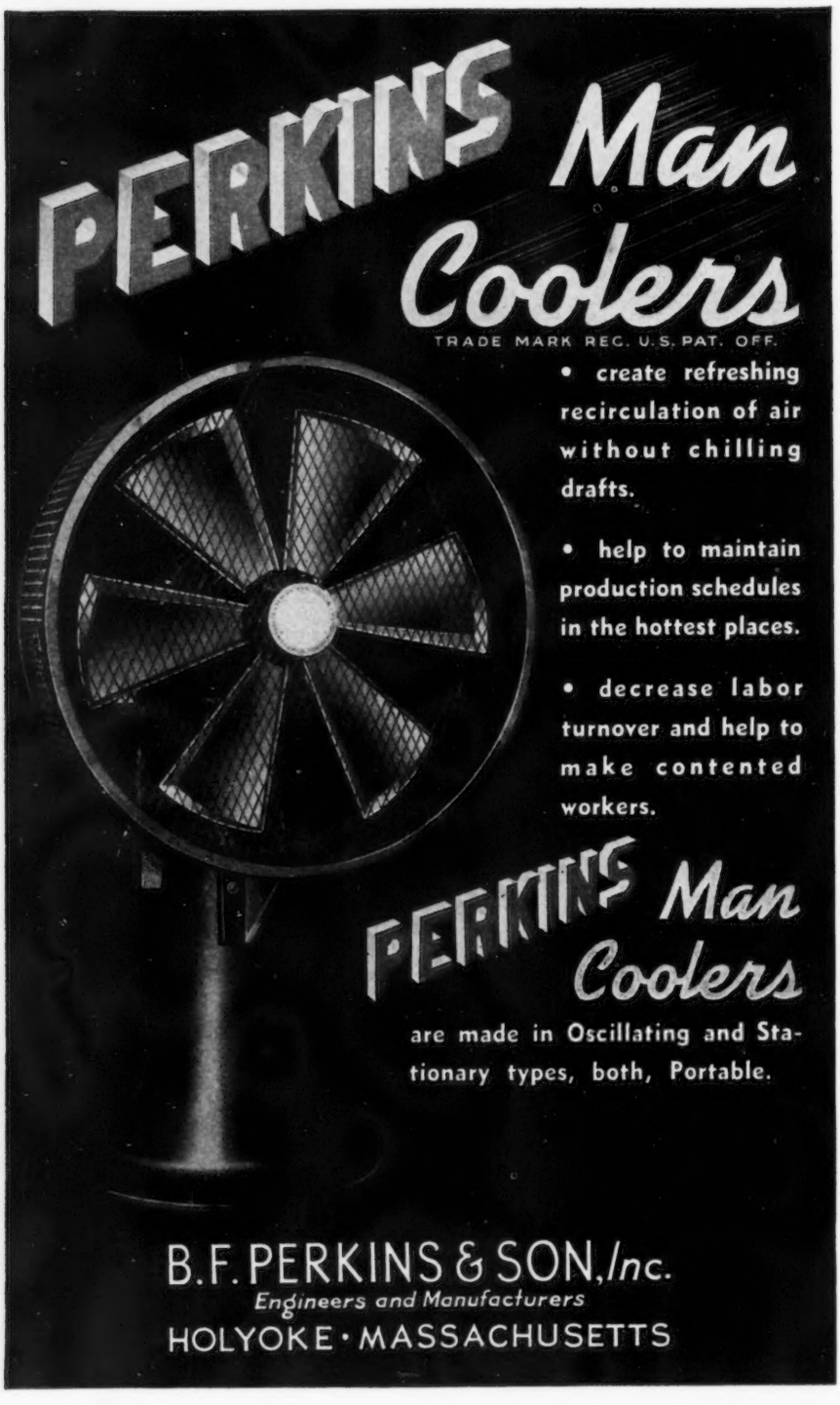
treating of steel were listed by R. E. Zimmerman, vice-president, U. S. Steel of Delaware. The company is concerned, he said, with such matters as the air-conditioning of blast furnaces, regulation and control of refining reactions in the open hearth, or the possible merits of providing a gaseous mixture other than air for the bessemer converter. A new magnetic mechanism, embodying wholly new features, is under development by the corporation in connection with concentration of lean iron ores, looking to that day when tapping of secondary ore reserves in this country may become necessary.

Mr. Zimmerman described the Austempering heat-treating process and told of the proposed direct reduction of iron ore at relatively low temperatures, without use of a blast furnace, to produce sponge iron. "A comparatively new grade of tin plate, coated electrolytically and known as Ferrostan, is an outstanding development of our largest subsidiary," he said. "It is by far the most successful project of its kind in the industry and is being further perfected by additional research. The latest useful device evolved by the corporation in connection with regulation and control of temperature is a pyrometer for measuring temperature of liquid steel in open hearths.

Unanswered technical problems of the steel industry, Mr. Zimmerman told the stockholders, "include the direct continuous casting of semi-finished steel, use of oxygen in blast furnaces, carbon gases in the bessemer, elimination of surface defects from ingots, development of new alloys for high temperature service and production of rolls with greatly superior surfaces.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Canadian War Orders $2,635,844 in Week

TORONTO — War contracts placed by the Department of Munitions and Supply during the past week had total value of $2,635,844, the largest individual contract going to Eastern Contractors, Ltd., Saint John, N. B., for construction work, while mechanical transport orders were the most important of the awards of the week.

With most of the immediate needs for plates and sheets on shipbuilding account contracted for either with Canadian producers or with United States producers, demand for these materials has tapered off during the past week or two. While demand has dropped below the high average of a month or two ago, it continues above the average of preceding two or three years. The automotive industry is buying, and new orders recently placed by the Munitions and Supply Board, Ottawa, for trucks, cars, etc., will strengthen demand for steel on this account, with the bulk of the new business expected to go to the United States. Canadian mills report sheet booking to the end of July.

Bureau of Public Information, Ottawa, announces that wartime construction work now is well under way in every province in Canada. To date approximately $13,000,000 in construction contracts have been let. The awards include 169 separate projects and are for the Air Force, national defense, buildings for military purposes and for manufacture of munitions.

Other construction projects throughout Canada are increasing at a steady rate with corresponding improvement in demand for structural steel, reinforcing steel, builders hardware, etc.

Steel Plant Studied In British Columbia

ESTABLISHMENT of a steel mill in British Columbia is considered a possibility, according to the provincial government. This subject was discussed at an open forum staged by the mining bureau of the Board of Trade, Vancouver, B. C.

Dr. Victor Dolmage, geologist and mining engineer, Ernest Redpath of the Association of Professional Engineers, and Professor F. A. Forward, University of B.C., were speakers at the open forum. Dr. Dolmage declared there are sufficient deposits of magnetite and other iron ore to justify establishment of a mill in the province. He said it might be necessary to bring in coal from other parts of Canada, as coast coal is not suitable for coking.

British Steel Rationing Plan In Full Operation Soon

LONDON—The new steel distribution plan recently announced in the United Kingdom will be in full operation by the middle of the year. It will insure that every British steel mill will operate practically at capacity output and that every pound of metal will be used in the best interests of the nation.

The bulk of steel orders will be canalized through appropriate Government departments so that the tonnage will be used with the maximum economic and strategic effect.

To facilitate the introduction of the plan the regulations were relaxed until April 29 in the case of new orders placed on or after April 8, and until May 31 for old orders placed before that date. Deliveries of new orders after April 29 and of old orders after May 31 will, however, have to be covered by the necessary departmental authority.

Structural Steel Contracts Up 36%

NEW contracts for fabricated structural steel closed in March rose 36 per cent from the February total to 127,731 tons, the American Institute of Steel Construction reports. First quarter tonnage was 302,689 tons, compared with 279,496 tons in the corresponding period of 1939. March shipments totaled 91,853 tons, against 125,259 tons in the like month of last year while the industry's backlog at the end of March was 391,042 tons.

National Tube to Rebuild Blast Furnace at Lorain

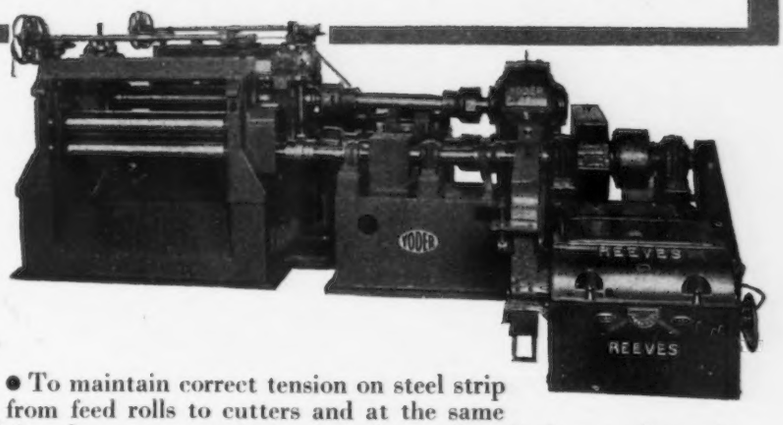
LORAIN, OHIO—National Tube Co. is to rebuild from the foundation up its No. 3 blast furnace here. The rebuilt unit which would include a new cast house and trackage to facilitate hot metal handling, will have an average daily capacity of approximately 1100 net tons. This represents increased capacity over the old unit which was last rebuilt in 1924.

Bryant Chucking Grinder Co. Plant Will Be Enlarged

CLEVELAND—Contracts for the second 14,000-sq. ft. addition to be built at the Bryant Chucking Grinder Co. plant in Springfield, Vt., in a six months' period, have been awarded to the Austin Co., engineers and builders. The project will provide a new machine shop with three 30-ft. bays, one of which will be equipped for crane operations.

Two Functions of Same Machine

Synchronized with REEVES SPEED CONTROL



● To maintain correct tension on steel strip from feed rolls to cutters and at the same time have cutter action correctly synchronized, regardless of width or gauge of metal, diameter of slitter knives and diameter of feed knives, the Yoder Co., builder of Yoder slitter shown here, has equipped the machine with a REEVES Variable Speed Transmission.

When slitter knives are ground to a new cutting edge, even though this be a few thousandths of an inch; and when feed diameter is changed or feed rolls are ground to a new diameter, REEVES provides perfect synchronization.

There's a REEVES Speed Control unit of the exact size and design to meet practically any industrial requirement. Catalog G-397 illustrates and describes them all, with many installation examples. Write for it today.

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Notably reduces power loss...

T-J

HYDRAULIC CYLINDER PISTONS are SEALED with PACKINGS

On test these cylinders show a 95% average efficiency for pressures from 500 to 2000 pounds per square inch. This applies to "blank" end pressures, that is, the "push" stroke of the cylinder. "Rod" end pressure stroke efficiency is from two to three points lower (because of the added sealing friction of the piston rod packings), but only until the pressure reaches 1000 pounds per square inch where the 95% efficiency is attained.

Catalog H-37 reports on additional construction features, service characteristics and gives complete cylinder specifications. Your copy (which also includes important usable data on hydraulic installations) will be sent promptly. Address The Tomkins-Johnson Co., 628 N. Mechanic Street, Jackson, Michigan.

this is a **TOMKINS-JOHNSON** *product*

Allis-Chalmers' CIO Contract Has War Clause

MILWAUKEE — Allis-Chalmers Mfg. Co. has renewed its contract with the CIO whereby certain adjustments will be made of wages in the lower brackets. Terms include stabilizing of employment as far as possible; no deductions from wages for spoiled production or scrap; agreement by the management to submit to the stewards in advance lists of men to be laid off or rehired and to give the union a list of job classifications and rates in the plant; some increases in vacations and the granting of leaves of absence in case of war duty.

Heil Co. Signs New Agreement With CIO

MILWAUKEE—The Heil Co. has entered into a new agreement with the CIO that will set up a union-management apprenticeship committee to confer with the company on this problem, increase the minimum wage from 55 to 57½c. an hour after the first six months of service and which will give employees with more than six years of service an additional two days' vacation with pay. About 550 workers are covered. Nordberg Mfg. Co. also has signed a new CIO contract which provides increased vacations.

Commodities Yearbook Sees Upswing in Prices

"COMMODITIES in Industry," a 1940 commodity year book this week released for publication by Commodity Research Bureau, Inc., predicts that a commodity price boom in the United States will be the inevitable result of the European war. Original research studies contained in the 720-page book ($7.50) indicate that every long war has been accompanied by a great advance in the general price level. Seventy-five commodities are analyzed in the book. Headquarters of the Commodity Research Bureau are at 82 Beaver Street, New York.

Packard Electric to Expand

WARREN, Ohio—The Packard Electric division of General Motors Corp. plans construction of approximately 75,000 sq. ft. additional space to its plant here. Hospital and other facilities for men and women employees will be provided with additional manufacturing space. N. B. McGregor is general manager.

300 Attend Cleveland Welding Conference

CLEVELAND—About 300 welding engineers and manufacturers attended the annual conference of the Cleveland section of the American Welding Society at Hotel Statler, here, May 3.

Three authorities addressed the afternoon session on topics of widespread interest. John J. Crowe, assistant to vice-president, Air Reduction Sales Co., New York, spoke on "Cutting and Machining With Oxy-Acetylene Torch." An address on "Flame Hardening, Flame Softening, Flame Strengthening" was given by J. H. Zimmerman, development engineer, Linde Air Products Co., New York. "Economic Production of Heavy Mechanical Equipment by Use of Welding and Cutting" was the topic of an address by George A. Jessop, chief engineer, S. Morgan Smith Co., York, Pa.

At the evening session Dr. J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, Ohio, addressed the conference on "The Metallurgy of Arc Welding."

Warehouse Association Chapters Elect Officers

CLEVELAND — Additional elections by chapters of the American Steel Warehouse Association include:

Pacific Northwest Chapter: president, William R. Case, Seattle Steel Co., Seattle, Wash.; vice-president, William A. Haseltine, J. E. Haseltine & Co., Portland, Ore.; secretary-treasurer, Everett W. Hawkins, Portland; national director, R. P. Mercer, Jacobs & Gile, Inc., Portland.

Wisconsin Chapter: president, George Gibbs, Gibbs Steel Co.; vice-president, L. R. Moise, Moise Steel Co.; secretary-treasurer, George W. Smith, Jos. T. Ryerson & Son, Inc., all of Milwaukee. Mr. Moise will also serve as national director.

Westinghouse Net Income Rises 72% to $4,041,429

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, reports net income for the first three months of this year of $4,041,429, compared with $2,356,151 for the corresponding 1939 period, an increase of 72 per cent.

the practical side of Springmaking — BY DUNBAR

ask yourself these questions about your springs

Are we now using the proper spring material?
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Do our springs have a tendency to take a "set"?
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Why do we have to replace springs?
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If you have any question about the performance of your springs, why not send your assembly here for a practical analysis

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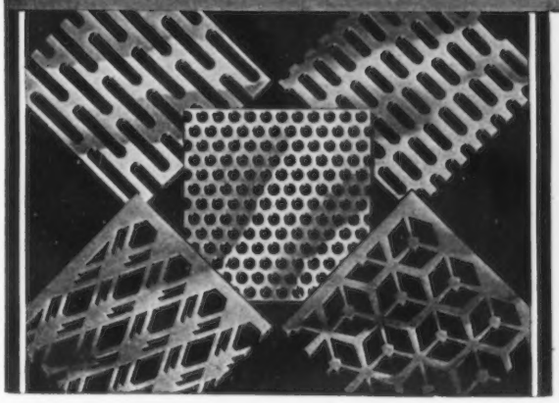

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Two Spindle Speeds

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Patented movement of Wheel Head

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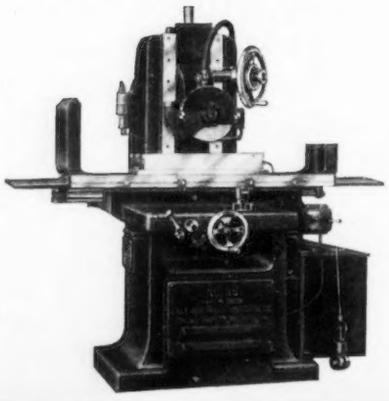

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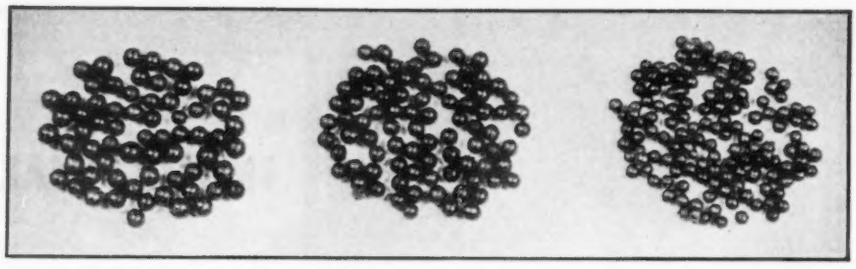

IN the period of one year we have built up a very large business with our Heat-Treated Steel Shot and Heat-Treated Steel Grit. This was accomplished on purely a quality product. Our many hundreds of customers, nationally known Concerns, are using our Shot and Grit, and saving money every day, blasting faster with less wear of abrasive. Our heat treating insures toughness and strength, fast blasting and long wearing. Try it in your machine and prove the truthfulness of these statements.

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A ton or a carload.
Will match any size.

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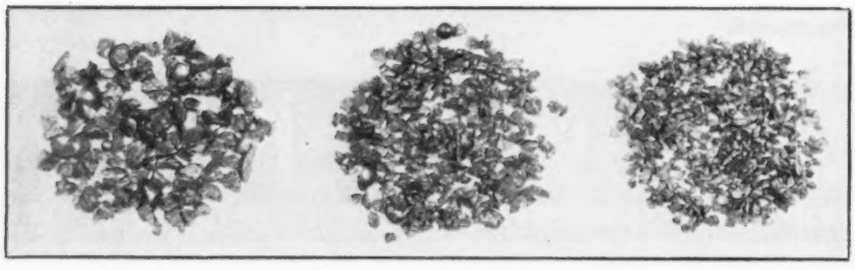
MANCHESTER, NEW HAMPSHIRE



Funds Sought for Work On Hole, Shaft Standards

A DRIVE for funds to further efforts to establish standards of allowances and tolerances for cylindrical parts and limit gages is under way under the sponsorship of a committee on standardization activity on cylindrical fits, American Society Mechanical Engineers. This committee is endeavoring to develop a standard shaft system as well as a standard hole system.

The funds will be used, according to R. E. W. Harrison of Chambersburg Engineering Co., chairman of the finance committee, to cover cost of duplicating extensive tables for reviews by members of industrial committees and for the salary and traveling expenses of a temporary secretary. The standards, when established, will be promulgated by American Standards Association.

Expenses of this activity in the past 15 years, Mr. Harrison said, has been borne by a small group of manufacturing concerns, but because of the national scope of the activity and the additional expenses necessary to complete the project, these few companies can no longer be expected to cover this expense. Contributions to the committee should be made payable to American Society Mechanical Engineers, 29 West 39th Street, and indorsed for standardization activity on cylindrical fits, A.S.A. project B4.

Sheet & Tube to Honor Veteran Employees

YOUNGSTOWN — Youngstown Sheet & Tube Co. employees with 25 years or more of service will be honored at a party in Stambaugh Auditorium, May 18. Gold emblems will be given the employees in a group including about 1,069 persons with a total of 31,776 years of service, an average of 29.7 years each. A survey shows 17.64 per cent of the company's employees have served 20 years or longer.

Charles Goers, with 56 years of continuous service, and William Hinrichs, with 52 years, are the two oldest employees. Both are in the Brier Hill plant protection department and came to Sheet & Tube when it absorbed the Brier Hill Steel Co.

The group includes four women operators: Anna Farragher, telephone operator at the city office, 34 years service; and Mary Shea, Katherine Murdock, and Camilla Small, each with 25 to 30 years of service.

Sheet-Wire Corp. Formed at Detroit

DETROIT—Formation of Sheet-Wire Corp. to enter into manufacture with steel mills and nonferrous fabricators of rods, bars, and wire by an entirely new and lower cost process was announced here.

Dean D. Francis, formerly vice-president, National Bronze & Aluminum Co. and president, Wheeler-Schebler Carburetor Co., heads the new company as president and treasurer.

The new process would revolutionize present methods of large scale production of wire and similar products, according to Mr. Francis. With it, wire, bars and rods—round, flat or polygonal—are produced by continuous slitting of sheets into many strands instead of requiring the use of multiple drawing dies, the standard practice today. It also avoids necessity of costly annealing and pickling.

A sharp reduction in wire producing costs is forecast by Mr. Francis, who stated that plans for the first installation are already under way with an important steel producer.

Other officials of the new corporation include F. E. Birch, former chief engineer, Buffalo Pressed Steel Co., and F. L. Armstrong, formerly vice-president, Thorne Motor Corp. and Gas-Electric Corp., Chicago, vice-presidents; and Athel F. Denham, president, Denham & Co., Detroit industrial marketing organization, as secretary and assistant treasurer.

Directors include Mr. Francis, Mr. Birch, and H. L. Markham, of Chicago, who is also a director of Dayton Electic Co., Sangamo Electric Co. and Cunningham Drug Stores, Inc.

The process was originally developed by one of the country's largest producers of steel mill equipment.

Hydraulic Institute Offers Awards for Essays

HYDRAULIC INSTITUTE, 90 West Street, New York, has announced details of the first annual engineering essay award sponsored by the institute to stimulate interest of young employees in problems of the pump industry. Subject of the essays, for which three awards totaling $175 will be given, may be on a variety of subjects. Any employee of institute member companies except department heads is eligible. The closing date is Sept. 30, 1940. C. C. Rohrback is secretary.

OVERHEAD OR UNDERGROUND

CAREY HEAT INSULATION CUTS COST OF TRANSPORTING STEAM

Sound engineering and correct insulation are problems of major importance to the economical transportation of steam.

For many years, CAREY has been meeting these problems of the power industry, with insulations which time has proved to be of maximum efficiency and permanence. CAREY Insulations are the development of more than 60 years of research and manufacturing experience. They meet every service condition from sub-zero to 2500° F.

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Write for Carey Insulation Catalog—Address Dept. 26.

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BRANCHES IN PRINCIPAL CITIES

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A.S.M.E. Plans Meetings In Three Cities

FOR the first time in the history of the American Society of Mechanical Engineers, the 1940 semi-annual meeting will be held in three cities at the same time. Simultaneous meetings are planned at Milwaukee at the Hotel Pfister, June 17-20; at Ann Arbor, Mich., at the University of Michigan, June 20-21; and at Asbury Park, N. J., at the Berkeley-Carteret Hotel, June 19-22.

Featured at the main meeting in Milwaukee will be 13 technical sessions covering hydraulics, steam power, education and training, management, fuels, machine-shop practice, process industries, and railroads, besides several plant trips, luncheons, business meeting, and a banquet. F. O. Volz, Lakeside Bridge Steel Co., Milwaukee, will discuss the use of welded construction for machine tool bases, while at the same session on June 19, F. J. Dost, Sterling Foundry Co., Wellington, Ohio, will present the foundry viewpoint in making better machine tool castings. The following day, E. E. LeVan, vice-president of Haynes Stellite Co., will discuss hard facing, and Francis J. Trecker, Kearney & Trecker Corp., will describe a new method of tool and die milling.

The meeting at Ann Arbor, under the sponsorship of the society's applied mechanics division, will present four technical sessions devoted to elasticity, dynamics, fluid mechanics, and thermodynamics. Besides an exhibit of diesel engines and accessories, the A.S.M.E. oil and gas power division's meeting in Asbury Park will include six sessions on the subjects of diesel-engine fuels, shaft couplings, marine diesels, engine design, operation, and maintenance.

P&H HEVI-LIFT HOISTS

UNLOADING FASTER and SAFER WITH "THRU-THE-AIR" HANDLING!

Slow and dangerous loading and unloading went "by the boards" when a 5-ton P&H Hevi-Lift Hoist replaced hand methods in this mid-west shipping center! With this modern, "thru-the-air" handling, docks are cleared faster, and danger to the workmen has been practically eliminated. *Speed and safety* — two important factors on any material moving job — are always improved when you turn to "thru-the-air" handling with P&H Hevi-Lift Hoists. Wherever your problem is lifting, lowering or moving bulk or packaged materials, chances are that P&H Hevi-Lift Hoists are the cost-cutting answer. It will pay you to investigate. Send for the booklet H-5, which describes P&H Hoists in all capacities up to 15 tons.

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Plastics in Engineering

A STUDY of the progress and extent of applications of plastics to design problems, together with a survey of the engineering features of various types of plastic materials commercially available, is contained in a book, "Plastics in Engineering," written by J. Delmonte, assistant to chief engineer, Chicago Flexible Shaft Co. Working from the premise that successful applications are achieved only when the designer understands the potentialities as well as the limitations of the material he deals with, Mr. Delmonte devotes considerable space to a discussion of the advantages and disadvantages of plastics in terms of engineering problems.

The chemistry of plastics and the art of molding are dealt with in detail and sections of the book are devoted to reviewing raw materials, chemical reactions involved in their formulation and methods of compounding them. Other sections cover surface coatings, mold design and molding problems.

Copies of "Plastics in Engineering," 465 pages, may be obtained from Penton Publishing Co., Cleveland, at a cost of $7.50 each.

April Pig Iron Output Drops Less Than One Per Cent

PRODUCTION of coke pig iron in April totaled 3,137,019 net tons, compared with 3,270,499 tons in March. On a daily basis the drop in April production was 0.9 per cent from that in March, or from 105,500 tons to 104,567 tons in April. The operating rate for the industry was 68.6 per cent against 68.9 per cent in March and compares with 50.4 per cent in April last year.

There were 157 furnaces in blast on May 1, operating at the rate of 106,395 net tons a day, compared with 152 on April 1, making 104,675 net tons daily. Six furnaces were blown in during the month and one was blown out.

Furnace Operations Now at 68.6 Per Cent, with 157 Stacks in Blast May 1

The United States Steel Corp. blew in two furnaces, independent producers put two in operation and took one off blast and merchant producers blew in two furnaces.

Among the furnaces blown in were: One Farrell, Carnegie-Illinois Steel Corp.; one Central, American Steel & Wire Co.; one Campbell and one Jeannette, Youngstown Sheet & Tube Co.; Anna, Struthers Iron & Steel Co., and City No. 2, Sloss-Sheffield Steel & Iron Co.

The only furnace taken off blast was one Lackawanna unit of Bethlehem Steel Co.

Production by Districts and Coke Furnaces in Blast

(All Figures in Net Tons)

FURNACES	April, 1940	March, 1940	April, 1939	May 1, 1940: Number in Blast	May 1, 1940: Operating Rate, Net Tons a Day	April 1, 1940: Number in Blast	April 1, 1940: Operating Rate, Net Tons a Day
New York:							
Buffalo	195,963	224,941	153,859	9	6,530	10	7,255
Other New York and Mass.	.....	.....	.....	0	....	0	....
Pennsylvania:							
Lehigh Valley	81,748	91,164	61,053	5	2,725	5	2,940
Spiegeleisen	4,735	11,251	4,945	1	160	1	180
Schuylkill Valley	40,861	43,713	17,120	3	1,360	3	1,410
Susquehanna and Lebanon Valleys	42,065	45,419	18,756	2	1,400	2	1,465
Ferromanganese	2,931	3,182	.....	1	100	1	105
Pittsburgh District	650,888	685,726	443,797	28	21,695	28	21,450
Ferro. and Spiegel.	26,564	27,461	5,904	4	885	4	885
Shenango Valley	14,839	13,370	14,561	1	675	0	....
Western Pa.	84,494	118,068	48,465	6	2,815	6	3,625
Ferro. and Spiegel.	15,408	15,991	3,619	1	515	1	515
Maryland	196,014	205,761	135,892	6	6,535	6	6,635
Wheeling District	164,075	172,859	106,796	7	5,470	7	5,575
Ohio:							
Mahoning Valley	282,927	239,221	210,342	14	10,635	11	8,710
Central and Northern	247,420	254,119	194,364	13	8,560	12	8,085
Southern	59,836	62,294	53,473	5	1,995	5	2,010
Illinois and Indiana	564,078	587,432	461,185	21	18,805	21	18,900
Michigan and Minnesota	122,771	126,917	89,462	6	4,090	6	4,095
Colorado, Missouri and Utah	62,996	50,367	47,307	4	2,100	4	1,625
The South:							
Virginia	.....	.....	.....	0	....	0	....
Ferromanganese	3,248	3,539	3,378	1	110	1	115
Kentucky	12,759	12,925	14,811	1	425	1	415
Alabama	255,321	269,199	213,828	16	8,645	15	8,500
Ferro. and Spiegel.	2,772	3,224	.....	1	90	1	105
Tennessee	2,306	2,356	.....	1	75	1	75
Total	3,137,019	3,270,499	2,302,918	157	106,395	152	104,675

Production of Coke Pig Iron and Ferromanganese

(All Figures in Net Tons)

	Pig Iron* 1940	Pig Iron* 1939	Ferromanganese† 1940	Ferromanganese† 1939
January	4,032,022	2,436,474	43,210	23,302
February	3,311,480	2,307,409	38,720	20,894
March	3,270,499	2,681,969	46,260	17,928
April	3,137,019	2,302,918	43,384	12,900
May	.....	1,923,618	....	8,835
June	.....	2,372,665	....	18,611
½ year	.....	14,025,053	....	102,470
July	.....	2,639,022	....	23,758
August	.....	2,978,991	....	23,103
September	.....	3,223,983	....	24,583
October	.....	4,062,901	....	26,817
November	.....	4,166,888	....	33,999
December	.....	4,220,536	....	40,654
Year	.....	35,317,374	....	275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1940	% Capacity	1939	% Capacity	1938
January	130,061	85.8	78,596	51.5	51,632
February	114,189	75.1	82,407	54.0	51,931
March	105,500	68.9	86,516	56.8	52,476
April	104,567	68.6	76,764	50.4	51,376
May	.....	...	62,052	40.8	45,343
June	.....	...	79,089	51.7	39,648
½ year	.....	...	77,486	...	48,717
July	.....	...	85,130	55.8	43,417
August	.....	...	96,096	62.9	53,976
September	.....	...	107,466	70.4	62,737
October	.....	...	131,061	85.9	74,147
November	.....	...	138,877	90.9	84,746
December	.....	...	136,146	89.4	79,872
Year	.....	...	96,760	...	57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January	16,475	11,875	11,911	18,039	11,801
February	14,773	10,793	9,916	18,496	12,652
March	11,760	10,025	9,547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	....	7,883	7,203	21,821	14,352
June	....	8,527	6,020	17,774	15,914
July	....	9,404	6,154	21,962	13,013
August	....	11,225	7,408	19,971	13,606
September	....	12,648	12,550	22,473	14,029
October	....	16,409	12,095	21,224	15,282
November	....	16,642	14,793	17,541	16,508
December	....	16,912	10,226	12,280	16,634

Customs Court Upholds Duty on Diesel Engines

WASHINGTON—The United States Court of Customs and Patents Appeals on Monday announced affirmation of the decision of the United States Customs Court assessing additional duties of 1 per cent of the appraised value of imported diesel engines and parts because of alleged undervaluation. The engines and parts were entered at the gross invoice value, less 25 per cent and 2.5 per cent. After reappraisement proceedings it was finally determined that the dutiable value was the invoice price less 10 per cent and 2.5 per cent. Bolinders & Co., importers, had protested assessment of the additional duties of 1 per cent.

$150,000 Contract Awarded By General Fireproofing

CLEVELAND—The contract for a $150,000 addition to the General Fireproofing Co. plant in Youngstown has been awarded to Gillmore-Carmichael-Olson Co., Cleveland. The structure will provide about 45,000 sq. ft. for storage and a press department. A 10-ton overhead crane and two 2-ton electric cranes will be installed.

The same construction company has received a contract for a fine wire mill for Allegheny Ludlum Steel Corp. at Dunkirk, N. Y. The building will be 280 ft. by 180 ft. Of saw-tooth construction, it will cost about $90,000.

Spencer Lens Co., Buffalo, has awarded the construction company an additional unit to the plant it built last fall. National Carbon Co. has awarded a new shipping building at Clarksburg, W. Va., to Gillmore-Carmichael-Olson Co.

Weirton Steel Vacation Program Is Liberalized

WEIRTON, W. Va.—Following negotiations between employee representatives and the Weirton Steel Co., liberal changes have been made in the company's vacation plans, summary of which is as follows: In case of an employee's death before receiving vacation pay, the wages go to insurance beneficiary or estate; employees retiring after Jan. 1, 1940, under the federal old age pension plan, are eligible for vacation pay for the year of retirement only; employees who were laid off during February, 1940, due to dismantling of hot tin plate mills will be eligible for vacation pay whether or not they may have been restored to employment previous to July 1, 1940, the effective date of the new optional vacation plan; in all cases the employee will receive vacation pay after June 30, 1940.

New Metering Device for Airplane Wing Flaps

CLEVELAND—A new metering device designed to eliminate the hazard of inequality in airplane wing flap operation is a new equipment item of the Pump Engineering Service Corp., Cleveland. The new method equalizes flow of hydraulic fluids to each control cylinder.

The new hydraulic flow equalizer, or flow divider, distributes fluid equally from a common pressure line into two discharge lines. These lines lead to the cylinders and incorporate a combination of pressure balancing valves to compensate for variations in required operating pressures. Variations in volumetric discharge from the two outlet ports is less than 1 per cent, even with pressure differentials up to 1400 lb. per sq. in.

Conversely, when the direction of flow is reversed, the equalizer allows only an equal amount of fluid from each line to enter the common line.

If for any reason one flap or cylinder should lock, the equalizer will lock also and thus prevent the other cylinder from operating. The equalizer can be applied similarly for synchronizing the operation of landing gear cylinders or any other pairs of hydraulic units.

Steel Ingot Output in April Dropped 7% Below March Rate

A TOTAL of 3,974,706 net tons of open-hearth and bessemer steel ingots was produced during April, a decline of 7 per cent from March, but 19 per cent more than in April, 1939, according to the monthly report of the American Iron and Steel Institute.

Revised figures for ingot output are 4,264,755 tons for March and 3,352,774 tons for April a year ago.

During last month the steel industry operated at an average of 61.04 per cent of capacity, compared with revised rates of 63.42 per cent in March and 51.11 per cent in April, 1939.

Steel ingot production averaged 926,505 tons a week in April of this year, as against revised figures of 962,699 tons a week in March and 781,532 tons a week in April of last year.

	Reported Production (Net Tons)		Calculated Production* All Companies		Number of	*Per Cent of Capacity
1939	Open-Hearth	Bessemer	Monthly	Weekly	Weeks	
January	3,344,830	165,193	3,578,863	807,870	4.43	52.83
February	3,085,746	219,728	3,368,915	842,229	4.00	55.07
March	3,547,915	218,057	3,839,127	866,620	4.43	56.67
1st Quarter	9,978,491	602,978	10,786,905	838,795	12.86	54.85
April	3,059,225	230,464	3,352,774	781,532	4.29	51.11
May	3,041,853	190,575	3,295,164	743,829	4.43	48.64
June	3,246,378	209,975	3,523,880	821,417	4.29	53.71
2nd Quarter	9,347,456	631,014	10,171,818	781,846	13.01	51.13
1st 6 Months	19,325,947	1,233,992	20,958,723	810,155	25.87	52.98
July	3,241,186	256,906	3,564,827	806,522	4.42	52.74
August	2,885,787	276,586	4,241,994	957,561	4.43	62.62
September	4,347,352	332,783	4,769,468	1,114,362	4.28	72.87
3rd Quarter	11,474,325	866,275	12,576,289	957,829	13.13	62.63
9 Months	30,800,272	2,100,267	33,535,012	859,872	39.00	56.23
October	5,512,718	453,600	6,080,177	1,372,500	4.43	89.75
November	5,589,235	453,103	6,147,783	1,433,050	4.29	93.71
December	5,358,320	353,250	5,822,014	1,317,198	4.42	86.13
4th Quarter	16,460,273	1,259,953	18,049,974	1,373,666	13.14	89.83
Total	47,260,545	3,360,220	51,584,986	989,355	52.14	54.70
1940						
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	61.04

*Revised.

Ryerson Succeeds Block as Chairman of Inland Steel

CHICAGO—Retirement of L. E. Block as chairman and election of Edward L. Ryerson, Jr., to that position was announced at last week's annual meeting of Inland Steel Co.'s stockholders. Mr. Block was named chairman of the executive committee, and P. D. Block was reelected president.

L. E. Block has been associated with Inland since 1897 and has served as chairman more than 20 years. His bother, P. D., now president, has been with the company since 1893. The two senior Blocks, together with George H. Jones, president, Hillside Fluorspar Mines, and former president of Inland, founded the steel company.

Mr. Ryerson has been vice-chairman of Inland since it acquired Joseph T. Ryerson & Son, Inc., in 1935. Mr. Ryerson had been associated with the Ryerson company, founded by his grandfather in 1842, since 1909, serving as president from 1929 to 1937, and as chairman since.

During the first quarter of 1940, Inland's operations averaged 85.7 per cent of capacity, according to P. D. Block, which enabled the company to earn $3,059,844 as compared with $2,024,601 in the same quarter last year, and $4,574,441 in the final 1939 quarter. In April, however, operations had fallen to slightly below 70 per cent.

L. E. BLOCK (left), for more than 20 years chairman of the board of Inland Steel Co., has resigned that position and EDWARD L. RYERSON, JR. (right) vice-chairman of Inland since 1935, has been elected to succeed him.

First quarter exports, Mr. Block said, amounted to less than 5 per cent of total shipments, most of this going to neutrals, especially South and Central America. With the exception of some shell steel billets sold to Canada, Inland has participated but little in the sale of war materials, according to Mr. Block. Higher operations later in the second quarter should result from the "fairly sizable tonnages" of flat rolled products booked at the recently reduced prices for May and June delivery.

Machine Tool Dealers Complete Program

TWO general sessions, with eight speakers, an informal banquet, two golf tournaments, and an informal dinner have been planned for the spring convention of the Associated Machine Tool Dealers of America, to be held May 13 and 14 at the Claridge Hotel, Atlantic City, N. J. In addition, an inspection trip to the Frankford Arsenal, Philadelphia, has been scheduled for the morning of May 15.

The first general session, on the morning of May 13, will feature addresses by John Sauer, Jr., secretary, Peninsular Machinery Co., Detroit, and president of the association; George A. Fernley, advisory secretary of the association; H. W. Young, production manager, Hamilton Watch Co., Lancaster, Pa.; and Col. L. H. Campbell, Frankford Arsenal. Mr. Young will speak on "Production of Interchangeable Precision Parts," and Colonel Campbell, on "Artillery Shell Production."

Addresses at the second general session, on the morning of May 14, will include: "What to Sell When Factories Are Loaded and Deliveries Are Bad," by F. W. Schiefer, F. W. Schiefer Machinery Co., Rochester, N. Y.; "Special Ordnance Machine Tools," by Tell Berna, general manager, National Machine Tool Builders' Association, and "How the Machine Tool Market Is Affected by the Airplane Industry Activity," by D. N. Macconel, Machinery Sales Co., Los Angeles. An address will also be made by J. E. Lovely, vice-president, Jones & Lamson Machine Co., Springfield, Vt.

At the banquet, on the evening of May 13, Com. H. M. Scull, Navy Department, Washington, will speak on "Navy Procedure in Machine Tool Purchases." Thomas A. Fernley, Jr., 505 Arch Street, Philadelphia, is executive secretary of the association.

Spot Acid Test for Porcelain Enamels

THE products standards section of the Porcelain Enamel Institute has issued a revised edition of the bulletin on acid resistance of porcelain enamels. This revision now makes it possible to check the finished porcelain enameled product by means of a spot test, where before it was necessary to cut out a sample and completely immerse it in the solution. The bulletin contains three sections—a commercial test, an umpire test, and a research test. The general classifications of acid-resistance, "AA", "A", "B", etc., remain the same as before.

This test is intended to cover flatware — that is table tops, signs, refrigerator and stove parts, architectural panels, and similar products. Cooking ware has been excluded, and will be covered in another bulletin.

. . . PERSONALS . . .

A. G. BUSSMANN, heretofore sales manager of the wire and springs department and district sales manager of the Buffalo district of the Wickwire Spencer Steel Co., New York, has been appointed general sales manager. He assumes all the responsibilities previously carried by R. L. FOSTER, vice-president in charge of sales, who has retired.

Mr. Bussmann served as chemist for the New York Public Service Commission after graduation from Carnegie Institute of Technology. Then for 14 years he was chemist and welding engineer for the American Steel & Wire Co. He joined Wickwire Spencer Steel Co. eight years ago.

Mr. Foster retires after an association of 40 years in the wire and wire products business, first as president of the J. C. Pearson Co., later as assistant general sales manager of the American Steel & Wire Co., and then as vice-president in charge of sales of the Wickwire Spencer company and its subsidiary, the American Wire Fabrics Corp.

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W. B. HURLEY has received appointment from Maj. Gen. C. M. WESSON, Army Ordnance Department, to be district chief of the Detroit Ordnance District under ALEX DOW, chief. Mr. Hurley, a staff engineer for the Detroit Edison Co., sales department, was commissioned under Wesson in the Ordnance Department of the Army during the World War and was several years in the service. Mr. Hurley, prominent in activities of the Society of Automotive Engineers, is chairman of the special programs committee for the Detroit Section, SAE.

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H. DENBIGH ELLIS, heretofore vice-president and treasurer of the Wilson & Bennett Mfg. Co., subsidiary of the Inland Steel Co., Chicago, has been elected president, succeeding WILFRED SYKES, who was chairman and president. Mr. Sykes continues as chairman.

Mr. Ellis has had a long and extensive experience in the container business. He has been with the Wilson & Bennett company for some time and was formerly connected with the Rheem Mfg. Co. and before that with the Associated Oil Co. on the Pacific Coast.

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CHARLES W. TRUST has been appointed general traffic manager of U. S. Steel Corp. subsidiaries, succeeding WILLIAM S. GUY, who is retiring upon completion of 49 years' service with subsidiaries and predecessor companies of U. S. Steel Corp.

Mr. Guy began as a stenographer with the old Carnegie Brothers & Co. in 1891 and subsequently became rate clerk and chief clerk of successor companies, being made assistant traffic manager of the former Carnegie Steel Co. in 1912. He became traffic manager in 1928 and in 1932 assumed similar responsibility for all U. S. Steel subsidiaries in the Eastern division. Mr. Guy has been general traffic manager for U. S. Steel subsidiaries since 1938.

Mr. Trust has been associated with the traffic department of Carnegie Steel and Carnegie-Illinois Steel Corp. for 36 years, having started as a traffic rate clerk in 1904. He was made chief rate clerk in 1917, assistant traffic manager in 1928 and assistant traffic manager of the Eastern division in 1932. He has been traffic manager of the Eastern division for the subsidiaries since 1938 and is president of the Traffic Club of Pittsburgh. In his new position, Mr. Trust will have general supervision over the traffic matters of the steel producing subsidiaries of the corporation and in addition will continue to serve as traffic manager for American Bridge Co., American Steel & Wire Co., Carnegie-Illinois Steel Corp., H. C.

A. G. BUSSMANN, general sales manager of Wickwire Spencer Steel Co. R. L. FOSTER, retired vice-president in charge of sales of the Wickwire company.

W. B. HURLEY, district chief of the Detroit Ordnance District.

Frick Coke Co., National Tube Co., and U. S. Coal & Coke Co.

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CHARLES S. BRADEEN, since 1938 assistant to COL. ROBERT H. MORSE, president of Fairbanks, Morse & Co., Chicago, has been appointed executive vice-president of the Canadian Fairbanks-Morse Co., Ltd., Montreal, Canada. Mr. Bradeen was formerly located in that city as secretary of the Canadian organization from 1930 to 1938.

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RAYMOND SZYMANOWITZ, technical director of the Acheson Colloids Corp., Port Huron, Mich., has moved with his staff to the new research laboratories of the company at 1019 Broad Street, Newark, N. J.

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DON W. BUCKSHORN, formerly manager of the Cincinnati office of the Louisville & Nashville Railroad, has been appointed traffic manager of the Crosley Corp., Cincinnati.

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G. E. HUNT, who has been identified with Cutler-Hammer, Inc., Milwaukee, since 1920, has been appointed to take charge of the company's Indianapolis office located at 307 North Pennsylvania Avenue. During the past 20 years he has served the company in a sales capacity in the New York, Philadelphia, Milwaukee and Cleveland offices.

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J. ROY PORTER, president since 1928 of the Marshall & Huschart Machinery Co., Chicago, was named chairman of the board of directors last week at a banquet honoring his 50 years of service to the machine tool industry. Attending the dinner were more than 60 representatives of the industry, including the heads of the 24 machine tool companies represented by Marshall & Huschart. Mr. Porter announced the election of GEORGE HABICHT, JR., to succeed him as president and general manager. Mr. Habicht was formerly Mr. Porter's assistant. FRANK SEESE, formerly secretary and treasurer, relinquished his duties as secretary to his former assistant, C. P. STOLLSTORFF, who becomes secretary of the company, and remains as assistant treasurer. GEORGE R. RAY continues as vice-president of the organization. All of these officials have been with the company 25 years or more.

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J. H. REDHEAD, president of the Lake City Malleable Co., Cleveland, has resigned as vice-president and general manager of the Erie Malleable Iron Co., Erie, Pa., to devote all his effort to the Lake City company business and that of the Columbus Malleable Iron Co., Columbus, of which he is also president.

L. CLAYTON HILL has been elected vice-president in charge of manufacturing of Murray Corp. of America. Mr. Hill formerly was general manufacturing manager. C. DAVID WIDMAN, secretary-treasurer, has been elected vice-president in charge of finance, H. W. WURSTER, formerly assistant secretary and assistant treasurer, has been elected secretary and treasurer.

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PERCY D. SIVERD, who has been associated with the Pittsburgh Screw & Bolt Corp., Pittsburgh, since 1916, has been made manager of sales of the bolt, nut and rivet division, Pittsburgh district. He will make his headquarters at the general office in Pittsburgh.

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GEORGE A. DUDEN, who has been associated with numerous warehouses and distributers of steel tubing for over 40 years, has joined the Standard Tube Sales Corp., Maspeth, N. Y., as vice-president. The company is eastern agent for Detroit Seamless Steel Tubes Co. and Standard Tube Co., both of Detroit.

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ELLIOTT C. PADDOCK, for the past year assistant sales manager of the Corbin Screw Corp., New Britain, Conn., has been made sales manager, succeeding E. E. BALDWIN, who has resigned. Mr. Paddock was assistant sales man-

H. DENBIGH ELLIS, new president of the Wilson & Bennett Mfg. Co.

CHARLES W. TRUST, general traffic manager of U. S. Steel Corp. subsidiaries.

CHARLES S. BRADEEN, executive vice-president of the Canadian Fairbanks-Morse Co.

ager of Greenfield Tap & Die Corp. before joining the Corbin Screw Corp.

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E. R. WALKER has become manager of the air conditioning division of the Fedders Mfg. Co., Buffalo

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GEORGE F. EMANUELS has been appointed district sales representative in Southern California for Columbia Steel & Shafting Co., Pittsburgh, with offices at 311 West Third Street, Los Angeles.

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J. E. BECK, formerly metallurgist, Pittsburgh works, Jones & Laughlin Steel Corp., has joined the New York sales office of Jones & Laughlin. Mr. Beck has been with the company for a number of years and has held various positions in the metallurgical department, some of which involved customer contact duties.

J. R. KEACH, of the Ohio Rubber Co., has been elected president of the Purchasing Agents' Association of Cleveland, Inc. PAUL T. SKOVE, Perfection Stove Co., is first vice-president; H. B. MARKLE, Harris, Seybold, Potter Co., second vice-president; F. E. CHESNEY, American Steel & Wire Co., secretary-treasurer, and J. M. STADTER, Glidden Co., fills the unexpired intermediate term as secretary-treasurer.

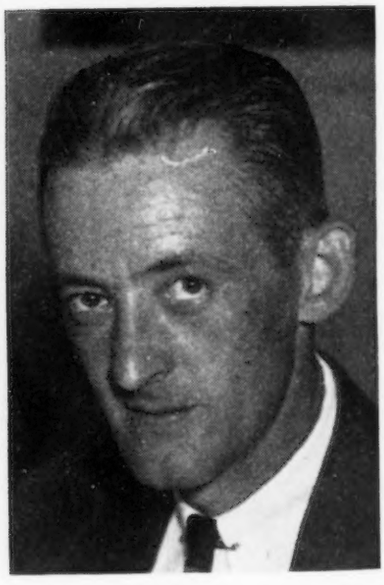
Carnegie-Illinois Promotes Operating Personnel

MALCOLM F. McCONNELL, whose appointment as manager of technical development was announced in these columns last week.

JAMES W. KINNEAR, JR., assistant manager of operations, Pittsburgh district.

HOWARD G. McILVRIED, general superintendent at Homestead.

LAWRENCE S. DAHL, general superintendent of Irvin works.



JOHN H. ELLIOTT, who has been promoted to assistant general superintendent, Irvin works, from assistant to general superintendent.

H. S. HARRISON has been elected assistant treasurer of Cleveland Cliffs Iron Co., Cleveland, and J. P. LONG, acting auditor, has been elected auditor.

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GEORGE GIBBS, head of Gibbs Steel Co., which he organized in 1921, staged an open house party for his many Milwaukee friends to commemorate the completion of a new addition to his plant which now occupies an acre of floor space. Gibbs Steel is a consolidation of Gibbs and Unity Sheet & Metal Co. and the officers besides Mr. Gibbs, are: Vice-presidents, R. A. FRANK and HUGH W. JONES; treasurer, T. F. BROSNAHAN, and secretary, MILDRED PACIUS.

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HARLOW H. CURTICE, general manager of the Buick Motor Division of General Motors Corp., and PAUL GARRETT, director of public relations of General Motors Co., have been elected vice-presidents of the corporation.

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A. W. LIMONT, JR., long a project engineer with E. I. du Pont de Nemours & Co., has become affiliated with the Titusville processing equipment division of the Struthers-Wells Co., Titusville, Pa. Expanding business has resulted in design and manufacture of certain types of equipment such as high pressure autoclaves, evaporators, dryers and kilns at the Titusville plant.

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BEN F. HOPKINS, president, Cleveland Graphite Bronze Co.; A. M. MACCUTCHEON, vice-president, Reliance Electric & Engineering Co.; F. C. CRAWFORD, president, Thompson Products, Inc., and HERMAN R. NEFF, president and treasurer, George S. Ryder Co., have been elected trustees for three-year terms of the Cleveland Engineering Society, which is celebrating its sixtieth anniversary this year.

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G. W. SWEENY has been appointed auditor, H. C. Frick Coke Co., Pittsburgh, and other coal producing subsidiaries of the U. S. Steel Corp. C. S. WARDLEY has been made treasurer. Mr. Sweeney has been connected with U. S. Steel subsidiaries for 32 years and Mr. Wardley for 45 years. In addition to the Frick Co., the men will serve in like capacities with National Mining Co., U. S. Coal & Coke Co., and U. S. Fuel Co.

WILLIAM R. HOYT, general manager of the Stamford Division of the Yale & Towne Mfg. Co.

WILLIAM R. HOYT, for a number of years works manager of the Philadelphia plant of the Yale & Towne Mfg. Co., has been promoted to the general managership of the Stamford division, Stamford, Conn., succeeding Richard G. Plumley, who resigned as of April 15. Mr. Hoyt joined Yale & Towne in 1902 as a machine hand on cylinder work. He forged ahead and through his 38-year association with the company was successively foreman, departmental superintendent, superintendent of production, assistant to the vice-president on production, and finally, in 1929 comptroller of production. In 1930 the materials handling division was moved to Philadelphia. There Mr. Hoyt was made works manager.

L. E. CREIGHTON, new vice-president of Rotary Electric Steel Co.

Cincinnati Industry Began With Building Of River Steamers

SKETCHES of some of Cincinnati's leading industries appeared recently in a 318-page special edition celebrating the 100th anniversary of the Cincinnati *Times-Star*.

A highlight of an industrial section of the publication was a history of the Cincinnati machine tool industry which has provided five presidents of the National Machine Tool Builders Association. The late William Lodge, one of the association's founders, headed the organization from 1903 to 1905. The late F. A. Geier, long chief executive of the Cincinnati Milling Machine Co., headed the association from 1909 to 1911.

The three living presidents of the association from the Cincinnati area are August H. Tuechter, president, Cincinnati Bickford Tool Co.; J. B. Doan, chairman, American Tool Works Co.; and E. A. Muller, president, King Machine Tool Co., and chief of the Cincinnati ordnance district for the Army.

Pointing out that Cincinnati is the world's largest center of machine tool manufacture, the *Times-Star* declared that this city produces more than $40,000,000 of machine tools annually, employs almost 7000 workers in making machine tools and pays them $12,000,000 annually in wages. Building of steamboat boilers and other parts marked the beginning of the city's machinery industry.

Lakes Ore Fleet Consists Of 289 Vessels

CLEVELAND—C. C. Lindeman, statistician of the M. A. Hanna Co. here, has completed his annual recapitulation report on the 1940 American ore carrying fleet on the Great Lakes. He lists 298 vessels against 303 at the beginning of 1939 and 308 in 1936 and 1937. Pittsburgh Steamship Co., with 74 vessels having a capacity of 724,850 tons, heads the American fleet, followed by Interlake Steamship Co. with 44 vessels with capacity of 407,800 tons. Capacity of the 22 American fleets is 2,722,740 tons.

. . . OBITUARY . . .

EDWIN FITCH NORTHRUP, vice-president and technical adviser of the Ajax Electrothermic Corp., died at his home in Princeton, N. J., on April 29, aged 74 years. He received his doctorate at Johns Hopkins University in 1895 and taught physics at the University of Texas the following year. He later returned East and worked with Prof. H. A. Rowland in the development of the multiplex printing telegraph system. He became chief engineer of the Rowland Printing Telegraph Co. and left the company in 1902 to form the Leeds & Northrup Co. with Maurice E. Leeds. Dr. Northrup was actively associated with this firm until 1910 and contributed largely to the design and perfection of instruments. For the next six years he did research work and taught at Princeton University and it was while there that he started the development of the coreless induction furnace. He was awarded over 100 patents on his inventions and was the winner of a number of honors and medals among them being the Edward Longstreth medal, the Elliott Cresson medal, the Edward Goodrich Acheson medal. He was cited as a Modern Pioneer by the National Association of Manufacturers.

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WALTER S. RUGG, retired vice-president of Westinghouse Electric & Mfg. Co., East Pittsburgh, died April 25 in New York. Mr. Rugg began his electrical career with Westinghouse in 1892 as a student engineer and in 1895 went to the Chicago office as district engineer and later was with the sales force. He was in the New York offices from 1901 to 1917, the last eight years as manager. He then returned to the East Pittsburgh works as manager of the railway department and later of the marine department. In 1922 he was made general sales manager of the company and in 1925 was elected vice-president. He was 74 years old.

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GEORGE A. HANNA, president of the Industrial Lubricants Co., Detroit, died May 2 at Detroit. Born in Windsor 50 years ago, Mr. Hanna had lived in Detroit since childhood. He was a member of the Detroit Board of Commerce.

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FREDERICK J. HAYNES, president of Dodge Bros., automobile manufacturers, from 1921 until May 1, 1925, died May 3 at Detroit. He had served as chairman of the board at Dodge from the time of his retirement as president

THE late Edwin Fitch Northrup, inventor of the coreless induction furnace.

until the summer of 1928 when he retired from business. He was 69 years old.

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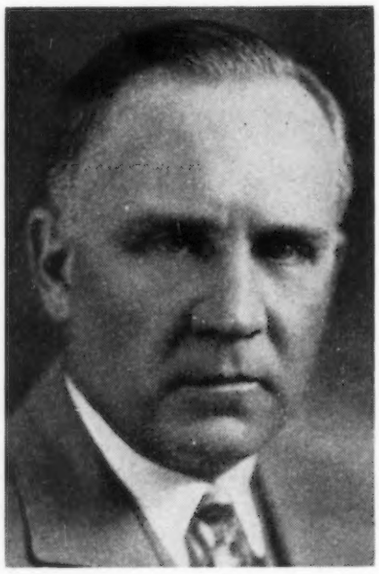
R. G. SCHRAM, vice-president and treasurer of Superior Pattern & Mfg. Co. from 1926 until 1937, was killed in an automobile accident April 27. Born in Dayton, in 1886, Mr. Schram had lived in Detroit and Grosse Pointe



CHARLES H. JOHNSON, executive vice-president of the Gisholt Machine Co., whose death was announced in these columns last week.

Park, Mich., since 1914. For several years he was president of the Michigan group of the National Pattern Makers Association.

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FRANK E. FISHER, inventor of the Fisher self starter for automobiles, was buried May 3 at Detroit. He died at the age of 81 in Chevy Chase, Md. Mr. Fisher, who entered the employ of Detroit Electric Co. in 1879, became its general manager and directed the installation of the first telephone switchboard in Detroit. Subsequently he invented the automobile starter which bore his name. He supervised the installation of the electric street railway system in San Jose, Calif. In 1924 he sold his factory in Detroit, the Fisher Electric Works, and devoted all of his time to the construction work on the present Masonic Temple Building in Detroit. In 1925 he was appointed manager of the new temple and from then on that was his principal interest.

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ROBERT F. FITZSIMONS, aged 68 years, who operated the Fitzsimons Steel Products Co., Milwaukee, until 1928 when it was consolidated with the Fitzsimons Steel & Iron Co., died April 29 at his home in Evanston, Ill., after an illness of several months.

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C. E. SWINDLER, district sales manager, Jones & Laughlin Steel Corp.'s Tulsa, Okla., office since 1937, died after a brief illness on April 25. He had been active for many years in a sales capacity for Jones & Laughlin in the Tulsa district.

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JAMES J. KORECKY, 58, president of the Barmatic Products Co., screw machine products manufacturer, died April 28, in Cleveland. He founded the Barmatic Products Co. in 1926. Previously he was connected with the National Acme Co. for 15 years.

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ROBERT F. CARPENTER, president and treasurer, Carpenter Metal Products Co., Cleveland, died May 4 at his home. In 1916 he founded the Sanymetal Products Co., predecessor of the present Sanymetal Products Co., Inc. He was 56 years old.

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MRS. JESSIE P. PIERCE, who became vice-president and secretary of the Betz-Pierce Co., Cleveland steel warehouse, in 1931 upon the death of her husband, died in Cleveland on May 4, aged 58 years.

Senate to Vote On Walter-Logan Bill

WASHINGTON — Despite its greatest efforts, the New Deal again has lost another battle in its war on the Walter-Logan bill, which is designed to put a muzzle on power-mad bureaucrats. Over the vigorous appeal of Majority Leader Barkley and his cohorts, the Senate Judiciary Committee on Monday voted unanimously that Senate action on the bill, previously approved by the House by a ratio of three to one, should be taken. Early floor consideration having been assured, it is predicted that the bill will pass the Senate by a large majority. Some estimates place the vote for the bill as high as 60, or a little under the 64 votes that could override a Presidential veto, though there still prevails in some quarters the view that a large Senate vote, when considered in connection with overwhelmingly favorable House vote, would prompt the President to sign the bill rather than try to kill it.

Appointed by the Senate Judiciary Committee to consider perfecting amendments to the bill was a subcommittee, consisting of Senator Hatch, Democrat of New Mexico, Senator Burke, Democrat of Nebraska, and Senator Taft, Republican of Ohio. This committee was scheduled to make a report on Wednesday whether the bill should be amended. Even some of the stoutest supporters of the principle of the measure charge that it needs amendment, and think action on it should be delayed till it has been smoothed out.

New Dealers have attacked the bill as being crudely drawn and pictured disaster for federal administrative procedure if the bill is passed in its present form.

Vickers, Inc., Builds $500,000 Addition

CONSTRUCTION of a substantial plant addition and new office quarters for Vickers, Inc., is to be launched at once adjacent to the company's existing plant at 1400 Oakman Boulevard, Detroit. The new building is to be of welded rigid frame sawtooth design, with offices in a second story section extending along the 340-ft. streamlined brick and limestone facade. It will be built by the Austin Co., which designed the project and is fabricating 580 tons of steel required for the 80,000 sq. ft. plant. The plant will represent an investment of approximately $500,000.

An increased demand for hydraulic controls and other equipment used by aircraft and machine tool industries is responsible for the expansion which will ultimately call for a sizable increase in plant personnel.

Outstanding features of the plant will be the all-welded "tree-form" columns which eliminate all need for shadow-producing web members in the three 40-ft. sawtooth aisles. These aisles will be equipped with cranes to expedite straight-line production. A tower 66 ft. high will be provided for testing oil pumps.

The roof deck of copper bearing steel will be welded directly to the purlins and covered by ½-in. insulation and bonded roofing. Provisions are being made for spraying water on the roof during the summer months for the purpose of maintaining comfortable working conditions.

New Ohio Company to Make Agricultural Machinery

COLUMBUS, Ohio—Har-O-Plane Co. has been formed to engage in the manufacture of agricultural machinery. According to Thomas H. Clark, agent and attorney, the new company will specialize in production of a combination harrow and drag machine. Incorporators are Howard D. Fink, Henry M. Cross and Thomas R. Corwin. The factory site has not yet been chosen.

Institute Meeting Program Announced

LEADERS of the steel industry will address sessions of the 49th general meeting of the American Iron and Steel Institute, to be held Thursday, May 23, at the Waldorf-Astoria in New York, it was announced by the institute.

Program of the meeting includes a morning session, luncheon, afternoon sessions, and a banquet. Attendance at all of these is restricted to individual members of the institute.

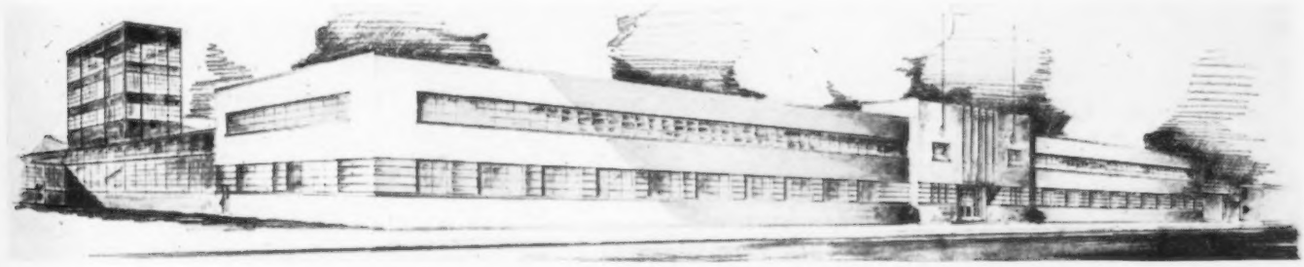
E. T. Weir, chairman, National Steel Corp. and president of the institute, will preside at the morning session and will deliver the opening address. Other speakers at this session will be Frank Purnell, president, Youngstown Sheet & Tube Co., and E. L. Ryerson, Jr., vice-chairman, Inland Steel Co.

A technical session in the afternoon will be presided over by James E. Lose, vice-president, Carnegie-Illinois Steel Corp. Three papers will be presented at this session.

Earl C. Smith, chief metallurgist, Republic Steel Corp., will discuss "The Control of Steel Composition and the Problems it Presents." A. C. Cummins, general superintendent, Youngstown district operations, Carnegie-Illinois Steel Corp., will read a paper entitled, "Dimensional Variations in Rolled Steel Products and the Problems of Control," and C. H. Herty, Jr., research engineer, Bethlehem Steel Co., will discuss "Producing Steel to Meet Physical Test Requirements."

Employees Work Six Weeks for Tax Collector

EACH employee of the Westinghouse Electric & Mfg. Co. "worked six weeks for the tax collector in 1939," a company statement to its employees revealed.



Sketch of the new Vickers, Inc., welded rigid frame plant and office structure at Detroit.

. . . THE NEWS IN BRIEF . . .

Automobile production slides off moderately and is now below 100,000 or over mark which has ruled for some time.—**Page 62.**

Buying improvement is noted in Detroit, where purchases in long-term brackets expand.—**Page 64.**

Possibility of exemptions from Walsh-Healey Act are studied at Washington.—**Page 66.**

Thomas measure would permit U. S. to acquire strategic materials in payment of foreign war debts.—**Page 68.**

Labor Board issues "desist" order against Michigan furnace company.—**Page 68.**

Congress, mindful of political conventions, prepares for early adjournment.—**Page 69.**

Labor Board disavows staff member's slighting reference to Supreme Court justice.—**Page 70.**

Government contracts for iron and steel products for week ended April 27 totals $732,845.—**Page 73.**

U. S. Chamber of Commerce strikes at defeatism in U. S., finds America still a "young" nation.—**Page 74.**

Body of Charles M. Schwab is moved to Loretto, Pa.—**Page 77.**

Commercial standards for sanitary cast iron enameled ware are revised as of May 25.—**Page 77.**

Procurement Division awards four contracts for 2104 tons of pig tin. —**Page 77.**

Industry machinery exports in March topped $37,000,000, second heaviest in history.—**Page 78.**

Swedish iron ore vital to Germany.—**Page 79.**

Loss of Narvik will deprive German steel industry of one-fourth of its ore supplies.—**Page 80.**

U. S. Steel is pushing export sales, E. R. Stettinius, Jr., tells stockholders; operations at 63.1 per cent.—**Page 81.**

War contracts placed by Canadian Department of Munitions and Supply, $2,635,844 in week.—**Page 82.**

Possibility of building a steel plant in British Columbia is discussed at mining bureau forum.—**Page 83.**

National Tube Co. will rebuild blast furnace at Lorain, Ohio.—**Page 83.**

New contracts for fabricated structural steel advance 36 per cent in March to 127,731 tons.—**Page 83.**

British steel rationing plan soon to be in full operation.—**Page 83.**

Bryant Chucking Grinder Co. plant will be enlarged.—**Page 83.**

Commodities year book for 1940 predicts general upswing in prices as war continues.—**Page 84.**

Allis-Chalmers CIO contract has war clause.—**Page 84.**

Heil Co., Milwaukee, signs new agreement with CIO.—**Page 84.**

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MEETINGS

May 6 to 10—American Foundrymen's Association, annual meeting and equipment exhibition, Chicago.

May 7 and 8—Society of Automotive Engineers, national production meeting, Hartford.

May 20 to 22—American Gear Manufacturers Association, annual meeting, Asheville, N. C.

May 21 and 22—American Steel Warehouse Association, annual convention, New York.

May 23—American Iron and Steel Institute, annual meeting, New York.

June 3 to 6—Annual international convention and Inform-a-Show, National Association of Purchasing Agents, Cincinnati.

June 6 and 7—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Niagara Falls, N. Y.

June 17 to 20—American Society of Mechanical Engineers, semi-annual meeting, Milwaukee.

Westinghouse Electric & Mfg. Co. shows 72 per cent increase in income during first quarter.—**Page 85.**

Packard Electric to expand.—**Page 84.**

300 attend Cleveland Welding conference.—**Page 85.**

American Steel Warehouse Association elect officers in Wisconsin, Pacific Northwest.—**Page 85.**

Drive for funds to establish standards of allowances and tolerances for cylindrical parts and limit gages is started by an A.S.M.E. Committee.—**Page 86.**

Youngstown Sheet & Tube Co. will give gold emblems to 1000 employees with more than 25 years' service.—**Page 86.**

Sheet-Wire Corp. formed at Detroit. —**Page 87.**

Hydraulic Institute offers awards for essays.—**Page 87.**

American Society of Mechanical Engineers plans to hold semi-annual meeting in three cities at same time.—**Page 88.**

April pig iron output drops less than 1 per cent.—**Page 89.**

Steel ingot output in April fell 7 per cent below that of March.—**Page 89A.**

General Fireproofing Co. awards $150,000 contract for plant addition to Gillmore-Carmichael-Olson Co.—**Page 89A.**

Weirton Steel Co. vacation program is liberalized.—**Page 89A.**

Customs Court upholds additional duties on shipment of imported deisel engines and parts.—**Page 89A.**

L. E. Block is succeeded by Edward L. Ryerson, Jr., as chairman of Inland Steel Co.—**Page 89B.**

Associated Machine Tool Dealers of America plan two general sessions at the spring convention, May 13-14, at Atlantic City.—**Page 89B.**

Spot acid test for porcelain enamels. —**Page 89B.**

Carnegie-Illinois Steel Corp. plans to buy additional tinning equipment from Continental Can Co.—**Page 92.**

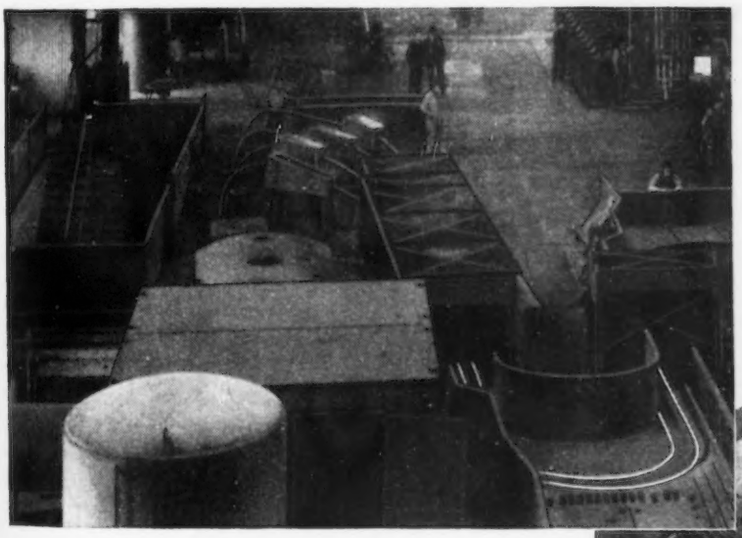
Supreme Court fixes May 24 as effective date of steel wage minimums under Walsh-Healey Act.—**Page 92.**

WIRE ROPE
is only as good as the rod from which it is made

WIRE rope has to be *right* to begin with. This puts a burden on wire rod that calls for modern equipment designed and built to maintain high quality standards together with high tonnage output.

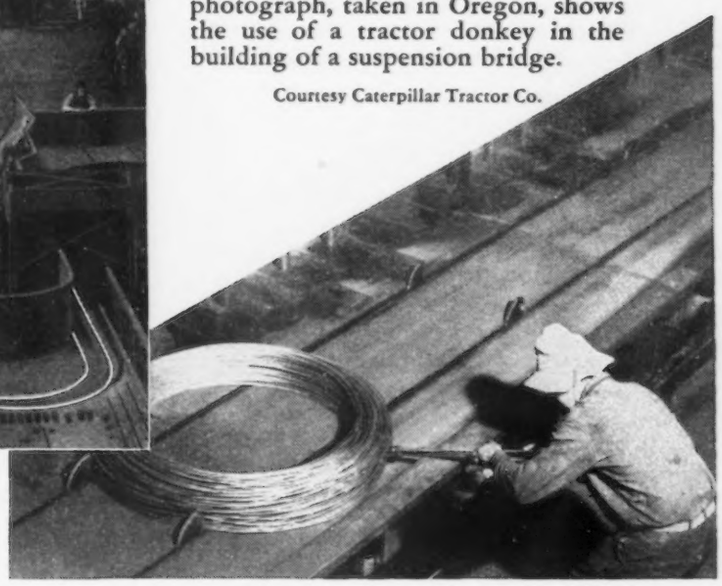
Morgan Continuous Rod Mills are rolling up new records in uniformity and capacity that meet the most exacting requirements of customers—*and stockholders.*

R-71



Steel cable plays an important part in modern logging operations. This photograph, taken in Oregon, shows the use of a tractor donkey in the building of a suspension bridge.

Courtesy Caterpillar Tractor Co.



MORGAN
WORCESTER
ENGINEERS AND MANUFACTURERS

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS, U. S. A.

CONTINUOUS ROLLING MILLS

ROD · STRIP · SKELP · MERCHANT SHAPES

New Wage Rates on Government Steel Orders Effective May 24

WASHINGTON—Immediate termination of the existing court injunction against the Secretary of Labor in the Walsh-Healey steel case was denied on Monday by the Supreme Court. The action, which denied the request of the Labor Department, automatically fixed May 24 as the date on which the steel wage order will become effective. All contracts entered into by Government departments after that date will carry a stipulation requiring adherence to the minimum rates decreed. Present contracts are not affected by the decision.

The Solicitor General on April 30 asked the court on behalf of the Labor Department that a mandate be issued immediately to the Circuit Court of Appeals rather than to wait the usual 25-day period after a Supreme Court decision. Counsel for the seven steel company litigants asked the court to deny the request.

During the 25-day period, the steel companies are expected to ask for a rehearing, but those familiar with Supreme Court practice pointed out that favorable action on such a petition, involving a case already heard on its merits and on which a decision has been rendered, would be a rare occurrence.

Meanwhile, the Supreme Court's April 29 decision, which upheld the steel wage order of the Secretary of Labor, was criticized by Representative Francis Walter, Democrat of Pennsylvania, as "a flagrant disregard of the intent of Congress." Holding that the labor secretary's determinations under the law are not subject to court review even though arbitrary and capricious, the Black opinion was 180 degrees out of phase with what sponsors of the law intended, Mr. Walter told THE IRON AGE.

New Farm Cold Storage Units Are Introduced

CHICAGO—A series of electrical and gasoline-powered walk-in coolers have been introduced by International Harvester Co. These new coolers are of such size that they will serve not only as ordinary farm refrigerators but also as farm cold storage units. The 10 standard sizes range from 110 to 572 cu. ft. capacity. Though developed primarily for the farm market, the cooler is expected to find a market also in the commercial field.

Kearney & Trecker Starts "Addition to Addition"

MILWAUKEE—The Kearney & Trecker Corp., with 75 per cent of the necessary equipment yet to be installed in its new manufacturing addition, has already started work on an addition to the addition. The new project, which will add 20,000 sq. ft. to the plant, will be devoted mainly to materials handling space, an experimental room and factory offices. The present experimental room located in the old building will be converted into a plant auditorium with seating arrangements for about 400 persons. This latest project of Kearney & Trecker is expected to be followed by a new office building.

C-I Buys Tinning Equipment From Continental Can Co.

CHICAGO—Carnegie-Illinois Steel Corp. is planning the purchase of additional equipment for the cold reduction of tin plate to round out facilities at the Gary sheet and tin mills. Negotiations are now under way with Continental Can Co. for purchase of some of the tinning equipment installed at Continental's plant at Clearing, Ill. If this equipment is purchased by Carnegie, it will be shipped to the Gary sheet and tin mills and operated there as part of the Gary plant.

Contrary to published reports appearing in Chicago early this week, Carnegie-Illinois has no intention of purchasing any can making facilities or of operating any part of Continental's present plant in the Chicago district.

Westinghouse Forms Vacuum Cleaner Section

MANSFIELD, Ohio—Creation of a separate vacuum cleaner section in the Westinghouse appliance department to coordinate the company's intensified activity on that appliance is announced by Frank R. Kohnstamm, sales manager of the Westinghouse merchandising division here. George E. Wagner, former laundry equipment regional supervisor, has been named manager of the new vacuum cleaner section in the appliance department, which is headed by H. B. Donley.

Carbide Tools

(CONTINUED FROM PAGE 54)

Considerable economies can be effected when carbide tools are made in the plant. Old shanks of tools that have worn out may be re-milled and carbide tips brazed onto them.

It is an inexpensive operation to machine and braze a carbide tool. There is no need of milling a pocket in the shank to fit the form of the carbide tip. When a tip is properly brazed in place, it will hold for any purpose within the working capacity of the tool. If the brazing fails to hold within a fraction of a thousandth of an inch the carbide tip will break, pocket or no pocket, because there is no elasticity in the carbide.

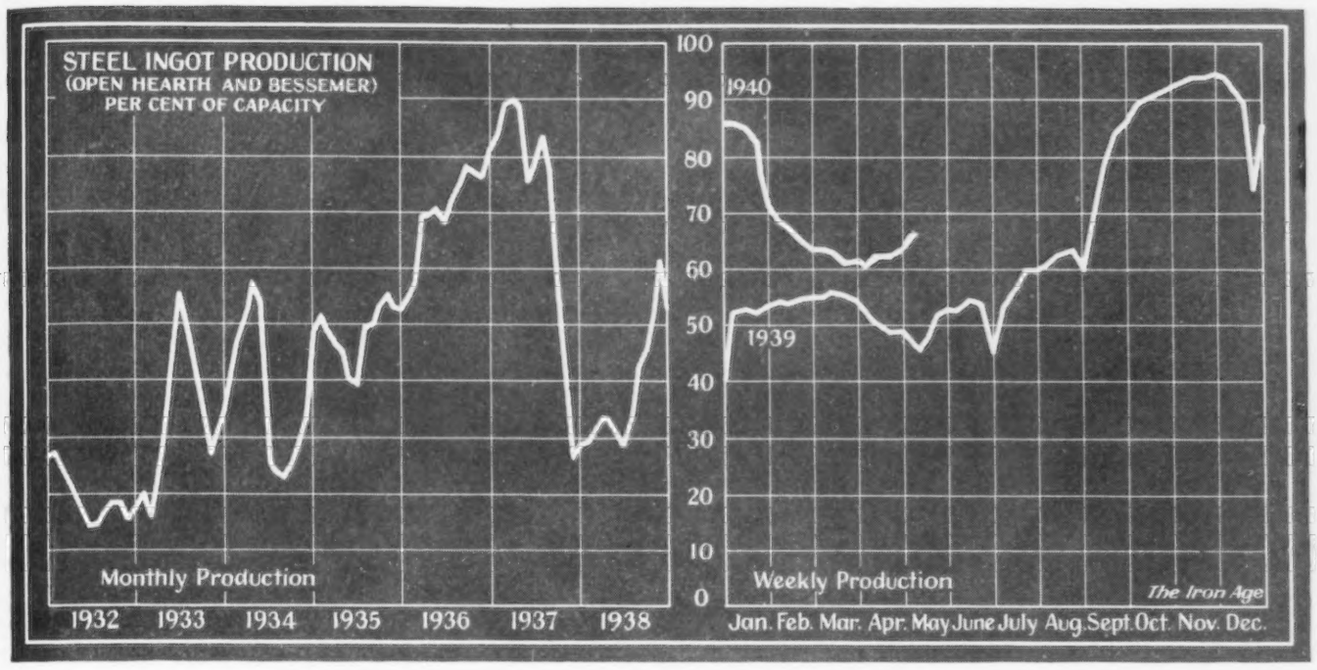
The illustrations in Fig. 6, 7, and 8 are for tools that are milled and brazed only. No grinding dimensions are given because there would be too many different styles of grinding involved and would be too numerous to list on the drawing. The "grinding sheet" takes care of the grinding dimensions, as shown in Fig. 2.

The drawing shown in Fig. 9 is for a special tool of which very few were made. The style No. 14 was applied arbitrarily. In the blocked out section are shown the two sizes of the tool, together with alphabetical references as to their finished dimensions.

Further elaborations on Figs. 6, 7, and 8 are hardly necessary as they are practically self explanatory. Attention might be called however to Fig. 8. Note that this drawing serves for the milled and brazed dimensions of three different styles of tools, namely, 03, 04, and 05. The alphabetical application to dimensions permit a wide range of variations and reduces the number of prints necessary.

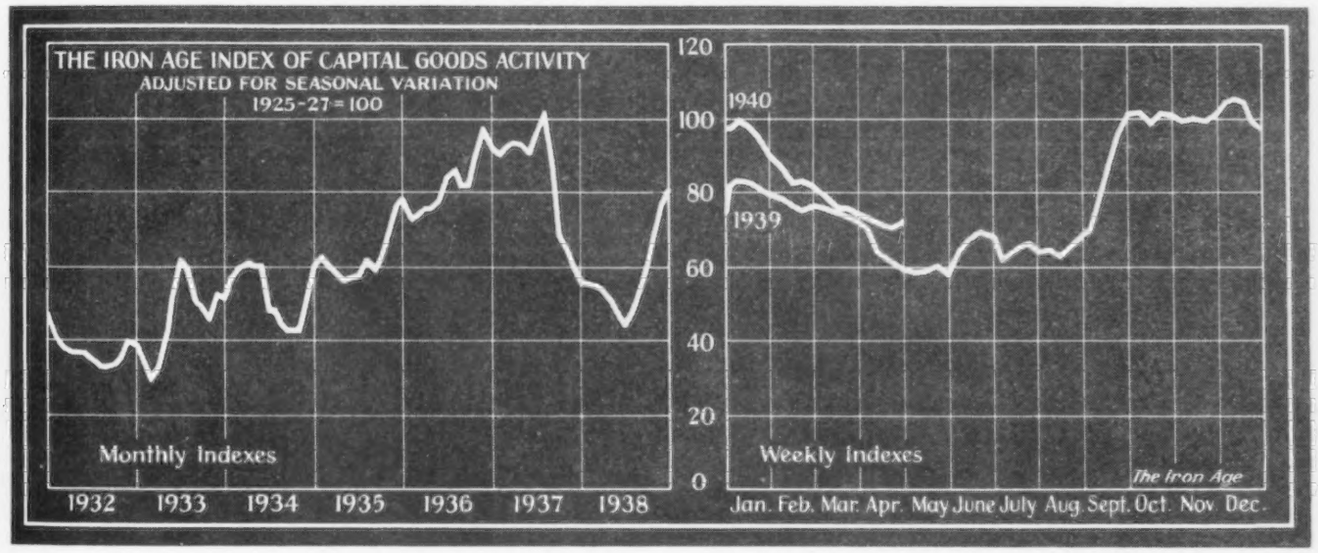
In conclusion, there is hardly a machine shop which does not have a number of discarded old core drills. If the side of the flues of the drills are ground back about ¼ in., enough to provide a flat surface, carbide tips can be brazed on which, after grinding, will provide a core drill that will exceed the cut-feet and production and life of the original drill.

Ingot Rate Rises to 66½% of Capacity



		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
District Ingot Production, Per Cent of Capacity	CURRENT WEEK..	62.0	65.5	61.0	75.0	66.0	59.0	93.0	73.5	81.5	72.0	70.0	39.5	57.0	**66.5**
	PREVIOUS WEEK..	59.0	59.5	53.0	73.0	67.0	52.5	92.0	73.5	81.5	55.0	63.0	39.5	57.0	**63.0**

First Gain in 10 Weeks Registered by Index



A PERCEPTIBLE quickening in the tempo of operations in the heavy goods industries was revealed in the past week, causing THE IRON AGE index to rise 1.4 points to 72.4. This is the first increase recorded in 10 weeks and brings the index back to the level prevailing a month ago. Largest contributors to the week's increase were the steel and Pittsburgh series. The improvement in the latter factor was due largely to a resumption of large-scale river shipments as the floods subsided. The period's increase in lumber carloadings was substantially greater than seasonal requirements, while the drop in automobile output was exactly equal to the seasonal trend. Construction activity in the week was sharply higher, due chiefly to intensified private building, but the 13-week average used suffered from previous poor weeks.

	Week Ended May 4	Week Ended Apr. 27	Comparable Week 1939	Comparable Week 1929
Steel ingot production[1]	81.3	79.7	62.2	126.5
Automobile production[2]	82.3	82.3	59.2	128.7
Construction contracts[3]	54.8	56.7	75.2	127.9
Forest products carloadings[4]	59.6	56.9	51.7	117.5
Production and shipments, Pittsburgh District[5]	83.8	79.5	47.9	123.5
Combined index	**72.4**	**71.0**	**59.2**	**124.8**

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ended April 27. Other indexes cover the week of May 4.

. . . SUMMARY OF THE WEEK . . .

. . . Strongest upward trend of this year has developed in past week.

° ° °

. . . Steel production at 66½%, orders in better volume, scrap prices rise.

° ° °

. . . Flat rolled steel specifications, export tonnage and seasonal gains responsible.

THE strongest improvement in steel orders thus far in 1940 has been experienced in the past week, resulting in a rise in ingot production of three and a half points to 66½ per cent, which has been accompanied by pronounced strength in principal scrap markets. THE IRON AGE scrap composite price has risen 37c. to $16.75, the fourth consecutive advance for a total of 71c. from the year's low point of $16.04 in the second week of April, but it is still 92c. below the high figure at the beginning of January and identical with the figure in the second week of last September, directly after the outbreak of war.

Improvement in steel operations and orders has been due primarily to three factors: Specifications received by the mills against recent low-priced commitments for sheets and strip, a good volume of export tonnage, and belated seasonal orders for some products.

Nearly all important producing districts have shared in the betterment. The Pittsburgh rate has risen three points to 62 per cent, the Chicago rate is up six points to 65½ per cent, the Youngstown rate has advanced eight points to 61 per cent, the Buffalo district is up six and a half points to 59 per cent, while the Southern Ohio district is 17 points higher at 72 per cent. The only loss was a minor one at Cleveland, where operations are 66 per cent.

STEEL companies are insisting that their customers, who obtained blanket coverages on sheets and strip at the recent low prices, shall specify in full in time for completion and shipment of the orders by June 30. There is apparently a determination to prevent the carrying over of shipments into the third quarter, some going so far as to notify customers that any portion of outstanding commitments not specified in time will be cancelled. Thus far some companies have received specifications for 40 to 50 per cent of the tonnage booked while others have not done better than 25 per cent. If all of the outstanding tonnage, which probably amounts to several hundred thousand tons, is specified in full, sheet and strip mill operations during June will be at capacity, but this will in all probability be followed by a letdown in midsummer.

While the outlook is, therefore, moderately good for the remainder of this quarter at least, domestic steel business needs the stimulus of greater activity in building construction and railroad equipment buying.

Events abroad, while tending to restrict our European market to Great Britain and France, have resulted in a larger flood of inquiries and orders from other parts of the world. Moreover, the threatened spreading of the war area will, it is believed here, result in heavier steel and munitions orders from the Allies. Following the placing here of one large shell contract, others are being negotiated, one of which would require 40,000 tons of steel.

Accompanying the somewhat better steel outlook is a firmer tendency in prices. Concessions on nails have been withdrawn by some producers after the warehouse trade had been pretty well covered at the lower prices.

APRIL production of coke pig iron was only slightly below that of March, whereas steel ingot output last month dropped 7 per cent. The April pig iron total was 3,137,019 net tons compared with 3,270,499 tons in March. On a daily basis the drop from March was 0.9 per cent, last month's average having been 104,567 tons against 105,500 tons in March.

The pig iron operating rate in April was 68.6 per cent against 68.9 per cent in March. There were 157 furnaces in blast on May 1, a net gain of five during April.

Ingot output last month was 3,974,706 net tons, a decline of 7 per cent from March, but 19 per cent above April last year. The total for the first four months of the year was 18,303,811 net tons. With prospects for higher operating rates over the remainder of the quarter, the first half total probably will approximate 27,000,000 net tons.

Export buying has played a relatively minor role in the greater strength in scrap markets. Higher scrap prices this week are in areas far removed from seaboard. The Pittsburgh, Chicago, Cleveland, Youngstown and Detroit markets have shown the most marked upward tendencies, prices having risen from 50c. to $1 a ton on many grades.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	May 7, 1940	Apr. 30, 1940	Apr. 9, 1940	May 9, 1939
Rails, heavy, at mill	$40.00	$40.00	$40.00	$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Cleveland, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	**2.10**	1.90	2.10	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	**2.80**	2.60	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	**3.50**	3.30	3.50	3.50
Hot rolled sheets: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	**2.10**	1.90	2.10	2.15
Cold rolled sheets: Pittsburgh, Chicago, Gary, Buffalo, Youngstown, Cleveland, Middletown	**3.05**	2.85	3.05	3.20

Cents Per Lb.:	May 7, 1940	Apr. 30, 1940	Apr. 9, 1940	May 9, 1939
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	$5.00

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	23.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. Charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	**$17.25**	$16.75	$16.25	$14.75
Heavy melting steel, Phila.	16.75	16.75	16.75	15.25
Heavy melting steel, Ch'go.	**16.25**	15.625	15.125	12.75
Carwheels, Chicago	17.75	17.75	16.75	12.50
Carwheels, Philadelphia	20.25	20.25	20.25	16.00
No. 1 cast, Pittsburgh	17.75	17.75	17.75	15.25
No. 1 cast, Philadelphia	20.25	20.25	20.25	16.25
No. 1 cast, Ch'go (net ton)	15.75	15.75	14.75	11.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, electrolytic, Conn.*	11.50	11.50	11.50	10.25
Copper, lake, New York	11.50	11.50	11.50	10.25
Tin (Straits), New York	**47.625**	47.50	45.875	49.25
Zinc, East St. Louis	5.75	5.75	5.75	4.50
Zinc, New York	6.14	6.14	6.14	4.89
Lead, St. Louis	*5.00*	5.10	5.05	4.60
Lead, New York	4.85	4.95	4.85	4.75
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
May 7, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$16.75 a Gross Ton
One week ago	2.211	22.61	16.38
One month ago	2.261	22.61	16.04
One year ago	2.286	20.61	14.25

Finished Steel

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1940	2.261c., Jan. 2	2.211c., Apr. 16
1939	2.286c., Jan. 3	2.236c., May 16
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29

Pig Iron

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1940	$22.61, Sept. 19	$20.61, Sept. 12
1939	23.25, June 21	19.61, July 6
1938	23.25, Mar. 9	20.25, Feb. 16
1937	19.73, Nov. 24	18.73, Aug. 11
1936	18.84, Nov. 5	17.83, May 14
1935	17.90, May 1	16.90, Jan. 27
1934	16.90, Dec. 5	13.56, Jan. 3
1933	14.81, Jan. 5	13.56, Dec. 6
1932	15.90, Jan. 6	14.79, Dec. 15
1931	18.21, Jan. 7	15.90, Dec. 16
1930	18.71, May 14	18.21, Dec. 17

Steel Scrap

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1940	$17.67, Jan. 2	$16.04, Apr. 9
1939	22.50, Oct. 3	14.08, May 16
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 10
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3

. . . THIS WEEK'S MARKET NEWS . . .

STEEL OPERATIONS

. . . Ingot rate rises sharply to 66½% . . . Nearly all districts share

THE IRON AGE estimate of ingot production for the current week is 66½ per cent, three points and a half above last week's estimated rate. Nearly all important producing districts share in the better operations, which may be ascribed to these factors primarily: Specifications received against recent low-priced commitments for sheets and strip, a good volume of export buying, and belated seasonal demand for some products.

The two largest producing districts contributed a good share of the overall improvement. The PITTSBURGH rate rose three points to 62 per cent, the CHICAGO rate went up six points to 65½ per cent, and there were good-sized gains elsewhere, notably eight points to 61 per cent in the YOUNGSTOWN area, six and a half points to 59 per cent in the BUFFALO district and 17 points to 72 per cent in the SOUTHERN OHIO district. The only loss was one point at CLEVELAND, which is at 66 per cent.

NEW BUSINESS

. . . Orders turn upward, chiefly due to flat rolled specifications

ALTHOUGH steel order volume at PITTSBURGH has increased slightly in the past several weeks, the past week's experience represents the strongest upturn since the bottom was reached more than a month ago. It is to be noted, however, that at least a portion of this expansion in demand is directly traceable to forward sheet and strip buying, as a result of the withdrawal of bargain flat rolled product prices. Separation of this factor and the strength engendered by export purchases indicates that domestic activity affecting other steel products has increased only moderately, due to seasonal factors.

Compared with incoming business of a month or two ago, sheet and strip tonnages have been relatively heavy, but it is not expected that the total business which will be shipped from the mills at the recent low prices will anywhere near approximate the experience resulting from last May's bargain period, unless of course, the June 30 deadline on shipments is not adhered to. The flow of specifications at Pittsburgh during the past week has been sufficient to support between 55 and 65 per cent of ingot capacity.

Compared with one year ago, present activity of CLEVELAND and YOUNGSTOWN steel makers provides considerable encouragement. Production is higher, shipments are improved and prices are firmer. Whereas at this time last year the industry was just beginning to enter blanket contracts as the result of price weakness on flat rolled products, today actual sizes and delivery instructions are being received, which indicates a smoother production cycle.

Export markets are accounting for a greater proportion of total steel sales and the benefit of spring construction is accruing a little later this year, helping to cushion more effectively the declines in other industries.

CLEVELAND reports that no particular difficulty is anticipated in adapting domestic steel to applications where Swedish high carbon steel has been used until recently. Anticipating such a turn of events, razor blade manufacturers have adopted domestic steel on an increasingly larger scale in recent years, freeing themselves of dependence on foreign steel.

One important CHICAGO sales office last week enjoyed its best week of the year as regards specifications and was particularly gratified to see that this increase was general both as to products and to industries, thus indicating that a widespread general upturn may be in prospect. Another large CHICAGO producer, whose orders for the past weeks have been ranging from 40 to 45 per cent of capacity, last week reported incoming business at over 50 per cent with further increases likely. In the latter case, increased sheet specifications were largely responsible for the improvement. Generally speaking, however, CHICAGO offices have not experienced any particular rush on the part of sheet consumers to send in specifications against the blanket commitments made prior to May 1. It is probable that within two weeks' time specifications for a considerable tonnage will have been received.

Demand for structural plates and shapes is somewhat improved at CHICAGO while alloy steel business is concentrated mostly in the automotive industry, with agricultural implement makers and the oil industry also accounting for important tonnages. Manufacturers of agricultural machinery, steel warehouses and forgers are probably the most active all-around steel consumers in CHICAGO at the moment. The railroad car shops located in that district are in the market for good tonnages occasionally, but the demand from the railroads for new equipment is still far from the level predicted for this time earlier in the year.

The influx of orders during the recent price concessions on flat rolled items brought the total new bookings in April to a new high for the current year for most sellers in Philadelphia. Eastern Pennsylvania plate producers, who were generally unaffected by the price cuts, report little improvement in bookings in April. Chief activity at present is that of driving in rolling specifications for the low priced material. This effort appears to be meeting with fair success. New business placed in the past week was, as expected, very light. Greater activity is noted in construction field and reinforcing bars and structural shapes are moving in better volume.

Tide Water Oil Co. is seeking bids on 1200 tons bar-sized shapes, 700 tons plates, 600 tons seamless tubing and 300 tons of forging billets for a new cracking plant to be erected in the East. A large part of these tonnages is alloy material.

PRICES

. . . Concessions on wire nails withdrawn . . . Plates weak at Chicago

WITH bargain sheet and strip prices having been withdrawn, mills are putting pressure on consumers, to obtain specifications against low priced commitments. Miscellaneous users of steel have been prompt in furnishing mills with sizes and shipping instructions, while large consumers so far have been tardy in making known their actual requirements. The result of the latter condition will be to furnish a test of the withdrawal move by June 1 on cold rolled material and slightly later on hot rolled sheets and strip. Concessions on galvanized sheets and wire nails have been withdrawn, with moderate sized coverages at the bargain prices having been made. Concrete bar prices remain highly erratic.

In a few isolated instances, plates are being sold at CHICAGO at 1.90c. The published price, however, is 2.10c.

Galvanized sheets, which are now selling at the base of 3.50c. sold generally here prior to May 1 at 3.30c., and some business was taken at 3.20c. Reinforcing bars are still weak in the Middle West and in the past week good sized jobs have been taken at 1.50c. and 1.60c.

PIG IRON

. . . Events abroad reduce inquiries for export

POSSIBILITIES of spread of the war to the Mediterranean have dampened export inquiry for pig iron in the last few days, although a few small orders for delivery in that region have been placed. Domestic business continues dull. Higher steel operations have reduced pressure for lower prices.

Volume of current business at PITTSBURGH is changed but little from a week ago. The rising scrap markets may lend some strength to pig iron demand. Likewise the increase in finished steel product demand may be reflected in more liberal requirements from non-integrated steel makers.

Large volume orders are infrequent at CLEVELAND and YOUNGSTOWN, but all principal users are in the market, indicating low consumer inventories and fairly steady melting operations. Further evidence as to the melt is given by foundry coke deliveries, which so far this month are running ahead of April, which registered a gain over March. Midwestern pig iron producers find it virtually impossible to compete with Eastern seaboard furnaces under prevailing prices and rates. In addition to the rail haul of over $4 a ton, around $1.60 a ton is the estimated cost of piling pig iron on an ocean-front dock and later transferring it to a vessel.

Domestic order books are not open yet for the third quarter, according to CLEVELAND sellers. While automotive demand is falling, machine tool production is helping to cushion the decline.

Shipments of pig iron are holding in the NEW YORK area despite a slackening of new business, and are gaining slightly at PHILADELPHIA where April deliveries were a little heavier than in March.

April shipments of pig iron in the CHICAGO district were slightly under March but shipments of foundry coke were almost exactly on a par with the March figures. Spot sales of pig iron are in fair volume and the foundry melt appears to be holding at a fairly high level. An additional blast furnace was blown May 4 by South Works of Carnegie-Illinois Steel Corp., 22 of this district's 38 stacks now operating.

The BOSTON market so far as inquiry and sales go remains quite inactive, but deliveries on old contracts continue frequent. There is really nothing which might indicate a buying movement will develop, and the aggregate weekly melt is still on the downgrade, although the setback the past week was slight. Makers of machine tools forecast an upturn in demand for castings.

Shipments of pig iron to melters in the ST. LOUIS area have been stepped up since May 1, a movement suggesting that the month will show a considerable improvement over April. The melt in the steel mills is increasing. Stove foundries are operating on an average of three or four days a week, a schedule which probably will continue until June. The SOUTHERN OHIO pig iron market is dull and featureless. Shipments are unchanged but new business is all but nil. Foundry operations are unchanged with machine tool melters most active.

SHEETS AND STRIP

. . . Mills are insisting on early specifications against commitments

MANY of the sheet and strip producers are warning their customers that any portion of recent low-price commitments which are not specified in time for rolling and shipment by June 30 will be cancelled. There is obviously an effort on the part of the mills to prevent any carryover into the third quarter. Some mills are insisting that at least half of the coverages shall be specified by May 15 and that the remainder shall be specified soon enough thereafter to permit completion of orders by June 30.

Fairly heavy coverages were made with PITTSBURGH mills prior to the withdrawal of the $4 ton concession on sheets and strip, but specifications against orders are not coming at a rate satisfactory to the mills. Although small and miscellaneous buyers have been prompt in sending in their instructions, large consumers are still holding back, with the result that steel mill offices will probably be swamped with specifications towards the latter part of May. Although tonnages booked have been moderately heavy, steel producers do not look for a volume anywhere near that which materialized last May. Concessions on galvanized sheets were withdrawn last week but not before moderate sized coverages were made.

At CHICAGO sales offices specifications against blanket orders for sheet and strip taken prior to May 1 are coming in at only a fair rate. This hesitancy on the part of the sheet consuming trade is attributed by some to the fact that in a few cases stocks are still slightly above normal, that only a few of the consumers' plants are sufficiently active to require large tonnages of sheets at this time, and to a natural reluctance to buy so far ahead of the June 30 deadline. In the immediate CHICAGO district probably the most active users of sheets are manufacturers of various types of home appliances. Sheet sellers in that district would be hard pressed to roll and deliver all of their obligations if all of the blanket orders were specified in full. This eventuality would be unusual, of course, as many customers are often covered by several different mills and exercise their coverage in only one or two of these instances. As an example of this, one sheet buyer who asked to be covered for only 30 tons from one mill was covered by mail by other mills for a total of 2000 tons, a ridiculous figure when viewed in relation to the company's normal consumption. Though there has as yet been not the slightest disposition on the part of mills here to evade the June 30 deadline, it is still doubtful if the tonnage that is almost certain to be ordered next month can be delivered within the specified limit.

Continuous mill operations at CLEVELAND and YOUNGSTOWN are much higher, responding to the impetus provided by the recent short period of low prices. Sellers are driving in May specifications as rapidly as possible in order to lessen the chances of an unwieldy situation in late May or early June, which might be created if consumers were allowed to hold back total specifications. Galvanized sheet prices are now reported firm at CLEVELAND. New business in all principal sheet and strip items has declined since May 1.

STRUCTURAL STEEL

. . . A little improvement in lettings and new projects

ALTHOUGH fabricated structural steel lettings advanced to 11,400 tons and are almost double those of a week ago, the only award of size is 1325 tons for the Youngstown Sheet & Tube Co. blast furnace, precipitator and gas mains, YOUNGSTOWN.

New structural steel projects are also higher at 17,000 tons against 10,500 tons in the previous week. Outstanding inquiries are 2500 tons at Washington for an armory for the District of Columbia; 2500 tons for a plant for the Celanese Corp. at Narrows, Va.; 1700 tons for the Aluminum Co. of America at Lafayette, Ind.; 1500 tons at North Beach Airport, New York, for a land plane hangar; 1200 tons for a State bridge at North Adams, Mass., and 1000 tons for bridges in Georgia.

REINFORCING BARS

. . . Awards total 4220 tons . . . Inquiries are for 6930 tons

REINFORCING steel awards of 4220 tons are mostly in small lots, the only large letting is 1700 tons at Bethesda, Md., for the Naval Medical Center.

New reinforcing steel industries total 6930 tons, including 1700 tons at Evanston, Ill., for the Northwestern University Technological Institute.

Bids will be taken May 16 on a flood control project, Unit 4 at Johnstown, Pa., involving 500 tons of bars. U. S. Engineers at Rock Island, Ill., will take bids May 8 on 1200 tons of bars for Mississippi River dam and lock improvements.

Concrete bar prices continue highly irregular with going quotations being governed entirely by the merits of each job.

RAILROAD BUYING

. . . About 4300 cars on outstanding inquiries still to be placed

FREIGHT cars ordered in April totaled 1858, including some to be made at railroad company repair shops. Total freight cars awarded during the first four months of this year approximate 4761 units. Including passenger car business pending, as well as freight car inquiries which are yet to be placed, total cars involved approximate 4300. Louisville-Nashville may buy from 25 to 100 cement cars.

MERCHANT BARS

. . . Bookings are holding on an even keel

IN spite of more than normal bar stocks at some customers' plants, total hot rolled bar bookings matched the level of a month ago. Analysis of order books discloses activity among small and miscellaneous users. Auto centers are furnishing fill-in orders and export business remains at recent levels. The appearance of the first large British shell order recently may portend subsequent buying of this nature.

The merchant bar market at CLEVELAND continues on an even keel. Prices are declared to be firm and demand remains stronger than at this time a year ago. Implement makers are enjoying better sales of harvesting machinery than anticipated, which has provided additional bar business. Export demand remains good.

Forgers are fairly active in the CHICAGO market at present, being busy on orders from the aircraft, oil and diesel engine industries. Production of road machinery and industrial tractors is also proceeding at a high rate. Makers of farm machinery are important consumers of bars and many implement and farm tractor plants are operating at capacity.

PLATES

. . . Demand is slightly better in some districts

PLATE specifications at PITTSBURGH are moderately ahead of a month ago and likewise reflect improvement from a week ago. The gains have been partly due to shipbuilding tonnage, export demand and the starting of some construction work, which had been delayed owing to adverse weather conditions earlier in the year.

Orders and shipments are good at CLEVELAND as the result of construction projects. Particular benefit has been derived from several Southern jobs involving large tonnages. Demand for special analysis plates has been excellent. Several Ohio tank makers are enjoying brisk seasonal business.

Demand for plates in CHICAGO is largely from tank builders and structural fabricators. Railroad shops are placing a few orders now and then but this phase of the business cannot be termed good. Plates have been sold at CHICAGO at 1.90c. in a few instances lately, but it is not believed that this weakness is at all general.

Easten Pennsylvania business shows little change in week-to-week volume. Fabricators are taking little material and railroad demand is nil. Shipyards are releasing small tonnages steadily, however. Shutting off of Scandinavia has sharply curtailed export business of the independent eastern Pennsylvania plate producers. Chief demand at present is from South America, with prices on some business being slightly below 2.15c. per lb., f.a.s. Switzerland is seeking prices on additional lots of boiler plate.

WIRE PRODUCTS

. . . Price concessions on nails are being withdrawn

THE highly competitive price situation which has prevailed in wire nails since mid-April shows signs of drawing to a close, it is reported at CLEVELAND. The jobber base price has been shaded less freely since May 1 than in the two preceding weeks. Meanwhile, domestic order volume received by producers is improved and export inquiries are again numerous. Manufacturers' wire continues on an even keel both from the standpoint of sales and prices. Increased use of domestic steel is inevitable owing to the difficulty of obtaining Swedish steel.

PITTSBURGH reports little or no change in total wire business during the past week except for coverages made on wire nails to jobbers. The latter business was booked at the recently prevailing concessions which were withdrawn last week. Export demand continues an important factor in wire rod order volume, while manufacturers' wire requirements are slow due to lack of active support from automobile centers.

IRON ORE

. . . April movement on Lakes totals 464,669 tons

THE April vessel movement of Lake Superior iron ore totaled 464,669 gross tons, against only 56,798 tons in April, 1939, and 3,770,555 tons in April, 1937, according to the Lake Superior Iron Ore Association in Cleveland. This year navigation did not begin until late in April.

TUBULAR GOODS

. . . Minor improvement in oil country and merchant trade

PITTSBURGH order books still reflect minor improvement in oil country goods specifications and to some extent in merchant pipe volume. Most of the gains recently have been seasonal in nature with no outstanding factor present in the market. Line pipe sales, representing a diversification in sizes and lengths, are holding at recent levels with little or no change in the price situation.

At CLEVELAND construction projects are providing much better demand for merchant pipe than was the case a month ago. Jobbers are freely replenishing stocks.

BOLTS, NUTS AND RIVETS

. . . Aircraft demand strong . . . Miscellaneous orders encouraging

MISCELLANEOUS orders are in good volume, the aggregate being above expectations. Aircraft demand in particular is strong. Automotive requirements are gradually declining. Cap screw makers at CLEVELAND report April dollar sales ahead of March and about equal to February volume. The outlook for May and June is considered satisfactory.

TIN PLATE

. . . Operations continue at 66% . . . Some packs to be late

TIN plate operations continue unchanged this week at 66 per cent. Releases have been stronger recently and the volume of specifications to mills has also improved. Some packs will be retarded slightly this year owing to weather conditions with the result that the active tin plate season will likewise be affected.

SHIPBUILDING

. . . Navy to open bids June 5 on three submarines

THE Navy Department on Monday called for bids to be opened June 5 for the construction of three 1500-ton submarines to require a total of 2100 tons of steel. Bids for the machinery for the submarines will be opened May 15. Contracts will not be awarded until funds are made available under the 1941 Naval Appropriation Bills.

The Maritime Commission has postponed from May 7 to June 18 the taking of bids on the construction of two transPacific luxury liners. The two ships will require a total of 27,500 tons of steel.

SEMI-FINISHED STEEL

. . . Specifications for sheet bars and skelp increase moderately

SPECIFICATIONS for sheet bars at Pittsburgh have increased moderately in volume during the past week, with further improved demand in sight. Skelp orders are more numerous, but there has been no important change in the level of wire rod business. Although export demand is not as brisk as a month ago, foreign bookings still supply a large measure of support to this market.

At CLEVELAND semi-finished steel has been quieter recently than any other division. Orders and shipments are routine for the most part. Forgers continue to enjoy brisk activity.

Foundrymen Elect Shannon President

CHICAGO—L. N. Shannon, vice-president and works manager, Stockham Pipe Fitting Co., Birmingham, was elected president of the American Foundrymen's Association at the annual business meeting held this week in connection with the annual convention and foundry equipment exhibition in Chicago. H. S. Simpson, president, National Engineering Co., Chicago, was elected vice-president of the association.

Elected for three-year terms as directors were: Henry F. Washburn, president, Plainville Casting Co., Plainville, Conn.; B. D. Claffey, General Malleable Corp., Waukesha, Wis.; George Cannon, vice-president, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.; Harold J. Roast, vice-president, Canadian Bronze Co., Ltd., Montreal, and L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland.

The J. H. Whiting Gold Medal for outstanding achievement in the foundry industry during the past year was awarded to Frederick K. Vial, vice-president, Griffin Wheel Co., Chicago, and vice-president of the Association of Manufacturers of Chilled Car Wheels. Mr. Vial was honored for his work in the development of cupola melting processes.

The exhibition of foundry equipment which includes displays of nearly 250 suppliers to the industry, has already proved itself an outstanding success. Last Saturday, which was set aside as a preview day for foundry executives and shop workers in the Chicago district, attracted a record crowd of approximately 9000. The attendance on Monday, which was the official opening day of the convention, was also highly satisfactory according to association officials who counted over 3500 registrations.

Total attendance by the end of the week including the preview on Saturday is expected to approach 20,000.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	May 7, 1940	Apr. 30, 1940	Apr. 9, 1940	May 9, 1939	1940	1939
Fabricated structural steel awards	11,400	6,700	5,450	28,650	259,800	355,710
Fabricated plate awards	310	450	3,870	310	55,175	67,300
Steel sheet piling awards	0	1,770	420	2,775	15,865	20,940
Reinforcing bar awards	4,220	4,150	13,200	10,350	148,600	176,945
Total Letting of Construction Steel	15,930	13,070	22,940	42,085	479,450	620,895

IRON AND STEEL SCRAP

. . . Higher prices at Pittsburgh and Chicago raise composite to $16.75.

MAY 7—THE IRON AGE scrap composite price has risen 37c. this week to $16.75 which is the fourth consecutive weekly advance and larger than any which immediately preceded. Prices of No. 1 heavy melting steel and other grades are higher in Pittsburgh, Chicago, Youngstown, Cleveland and Detroit. A good deal of the strength is due to bullishness among dealers but there has been some improvement in mill buying. A rise in ingot production this week has been a factor. Along the Atlantic Seaboard where the export movement is an outstanding factor, the markets are firm in sympathy with strength elsewhere but prices have not been advanced.

Pittsburgh

The market is stronger again this week partly because of influence of other districts and because of higher prices obtained on railroad list the past week. In addition to these factors there has of course been increased demand owing to the pickup in ingot output as well as the expectation that raw steel production will continue upward for awhile at least. No. 1 heavy melting steel has been sold into consumption in the past week at $17 a ton and better and a careful appraisal of all current factors substantiates an advance of 50c. a ton in No. 1 steel to a range of $17 to $17.50. Railroad heavy melting steel is up this week $1.50 a ton and, based on sales into consumption, is quotable this week at $18.50 to $19 a ton. Long rails are nominally quoted this week at $19 to $19.50, but rails to foundries nearby are commanding higher prices than this quotation. Specialties are again stronger by 50c. a ton.

Chicago

One of the smaller mills in this district last week paid $16 a gross ton for approximately 12,000 tons of heavy melting steel. Brokers are paying from $16.25 to $16.50 for No. 1 steel, mostly the latter price. On this basis No. 1 is quoted here this week at $16 to $16.50, the lower level marking the latest mill sale and the higher level the price brokers are paying to cover their orders. Some dealers are declining to sell at almost any price until this market is in a more settled condition than at present. Adding to the bullishness here is the rise in mill operations this week, with the prospects good for additional increases in new business as the quarter progresses. The Burlington sold a small tonnage of heavy melting steel early this week at the equivalent of $17.64 a gross ton, delivered.

Philadelphia

Sentimentally, the market appears a bit stronger this week, but there has been nothing in the way of new sales to substantiate higher levels for this district's list. Mill buyers are still reluctant to make new commitments, but this counteracted partially by the low level of dealers' stock piles. While No. 1 steel continues unchanged at $16.50 to $17, it appears unlikely that a tonnage of any consequence could be acquired at the lower range. Cast items are particularly strong. Blast furnace material also reflects a stronger price sentiment. This grade is advanced this week to $9 to $9.50 from a nominal $9 flat on the basis of recent offerings. The Mediterranean crisis is being followed closely by exporters here as shipments to Italy have accounted for the bulk of export activity at Port Richmond over recent months.

Youngstown

Recent activity supports a $17 to $17.50 quotation on No. 1 heavy melting steel, an advance of 50c. a ton. All other quoted grades are up correspondingly. Steel scrap is hard to obtain in quantity and dealers hesitate to commit themselves too freely in the face of the rising market.

Cleveland

Railroad sales and the latest monthly tonnage of automotive scrap from the principal body plant, as well as dealer prices, all indicate a higher market here, which is recognized this week in a 50c. advance on heavy melting and specialty grades. No. 1 steel is now quoted $16.50 to $17 per ton. The railroad steel brought $17.50, $17.75 and $18 a ton, with only a small amount believed sold at the latter figure.

Buffalo

Recent sales of No. 1 heavy melting steel at prices above the quoted range advance the value 50c. to $16.50-$17. One mill here continues to suspend shipments while increasing operations. Cast scrap is becoming increasingly scarce in the area and dealers are reluctant to sell at current prices. Three more shipments arrived here by water during the week, making a total of 25,000 tons so far this year.

St. Louis

The scrap iron market is steady, with prices unchanged. Strength has been given to the market because of strength in Eastern centers plus intimations that several mills in the St. Louis district will shortly buy substantial tonnages. Railroad lists closing this week include: New York, Chicago & St. Louis, 2300 tons; Wabash, 1300 tons; St. Louis Southwestern, 540 tons, and Chicago & Eastern Illinois, 231 tons.

Cincinnati

The scrap market is more active with dealers moving to protect their positions against anticipated heavier mill buying. Users have not begun extensive purchasing. Dealers bids are up 25c. under impetus of current optimism. Shipments against old commitments are more active.

Birmingham

Yards in this area are finding it less difficult to add to accumulations due to the excellent weather prevailing and perhaps to some extent by reason of the time-marking conditions experienced practically every week since the holidays. The larger buyers do not indicate any new interest. There have been no changes in quotations.

Detroit

Closing of automotive lists around the first of the month brought out a flood of optimistic dealer sentiment accompanied by speculative buying that continued the price upswing evidenced earlier in Detroit. Quiet sales are reported being made to consumers, but it is questioned whether these are proportionate to the amount of dealer optimism that exists at present.

New York

The market is stronger, but the better undertone has not yet been reflected in prices, which are unchanged from last week's levels. Scrap loadings for export were heavier last week.

Boston

For Weirton consumption, the market for steel turnings is 75c. a ton higher, and for bundled skeleton 60c. higher. Brokers are now paying $4.90 a ton on cars for turnings and $9.40 for skeleton, the best prices recorded in some time. Otherwise the market for steel is standing still, and demand for machinery and textile cast has dried up. Only one exporter is able to secure ocean space and only a very little at that; as a result, the export market is quiet and prices weak although not quotably lower.

Toronto

Demand for iron and steel scrap is developing on a broader scale in Canada. Machinery cast and stove plate are receiving special attention and there is a strong call for these materials. Offerings of cast and stove plate to dealers are limited and dealers' yards are scantily supplied. Consumers in urgent need of supplies have been buying in Buffalo and Detroit, and imports for March, all types of scrap, totaled close to 18,000 tons. One Hamilton dealer has purchased three large boats in the Buffalo area which will be wrecked for scrap. Turnings and borings also are being imported from United States points.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
Railroad heavy melting	18.50 to 19.00
No. 2 heavy melting	15.25 to 15.75
Railroad scrap rails	19.00 to 19.50
Rails 3 ft. and under	21.50 to 22.00
Comp. sheet steel	17.00 to 17.50
Hand bundled sheets	16.00 to 16.50
Heavy steel axle turn.	15.00 to 15.50
Machine shop turnings	11.00 to 11.50
Short. shov. turnings	12.50 to 13.00
Mixed bor. & turn.	8.75 to 9.25
Cast iron borings	8.75 to 9.25
Cast iron carwheels	20.00 to 20.50
Heavy breakable cast	15.00 to 15.50
No. 1 cupola cast	17.50 to 18.00
RR. knuckles & coup.	22.00 to 22.50
Rail coil springs	22.00 to 22.50
Rail leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet crops	22.00 to 22.50
Low phos. punching	21.50 to 22.00
Low phos. heavy plate	20.00 to 20.50
Railroad malleable	22.00 to 22.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.50 to $17.00
No. 2 hvy. mltng. steel	15.50
Hydraulic bund., new	16.50 to 17.00
Hydraulic bund., old	14.00 to 14.50
Steel rails for rolling	20.50 to 21.00
Cast iron carwheels	20.00 to 20.50
Hvy. breakable cast	18.50
No. 1 cupola cast	20.00 to 20.50
Mixed yard (f'd'y) cast	16.50
Stove plate (steel wks.)	15.00 to 15.50
Railroad malleable	21.00 to 22.00
Machine shop turn.	9.50
No. 1 blast furnace	9.00 to 9.50
Cast borings	10.50 to 11.00
Heavy axle turnings	14.00 to 14.50
No. 1 low phos. hvy.	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Steel axles	21.50 to 22.00
Shafting	22.00 to 22.50
Spec. iron & steel pipe	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$16.00 to $16.50
Auto. hvy. mltng. steel alloy free	15.00 to 15.50
No. 2 auto steel	12.75 to 13.25
Shoveling steel	16.00 to 16.50
Factory bundles	15.50 to 16.00
Dealers' bundles	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling, old	7.00 to 7.50
Rolled carwheels	17.50 to 18.00
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs	17.25 to 17.75
Steel coup. & knuckles	17.50 to 18.00
Axle turnings	14.50 to 14.75
Coil springs	18.75 to 19.25
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings	18.00 to 18.50
Low phos. plates 12 in. and under	17.50 to 18.00
Cast iron borings	9.50 to 10.00
Short shov. turn.	10.75 to 11.25
Machine shop turn.	10.00 to 10.50
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft.	18.25 to 18.75
Steel rails under 2 ft.	19.50 to 20.00
Angle bars steel	19.00 to 19.50
Cast iron carwheels	17.50 to 18.00
Railroad malleable	19.25 to 19.75
Agric. malleable	13.75 to 14.25
	Per Net Ton
Iron car axles	21.00 to 21.50
Steel car axles	20.50 to 21.00
Locomotive tires	14.00 to 14.50
Pipes and flues	10.50 to 11.00
No. 1 machinery cast	15.50 to 16.00
Clean auto. blocks	16.00 to 16.50
No. 1 railroad cast	14.00 to 14.50
No. 1 agric. cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Low phos. plate	19.50 to 20.00
No. 1 busheling	16.25 to 16.75
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	10.50 to 11.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.50 to $17.00
No. 2 hvy. mltng. steel	15.50 to 16.00
Comp. sheet steel	16.00 to 16.50
Light bund. stampings	14.00 to 14.50
Drop forge flashings	15.50 to 16.00
Machine shop turn.	9.50 to 10.00
Short shov. turn.	10.00 to 10.50
No. 1 busheling	16.00 to 16.50
Steel axle turnings	15.50 to 16.00
Low phos. billet and bloom crops	21.50 to 22.00
Cast iron borings	9.50 to 10.00
Mixed bor. & turn.	9.50 to 10.00
No. 2 busheling	9.50 to 10.00
No. 1 cupola cast	20.00 to 20.50
Railroad grate bars	14.25 to 14.75
Stove plate	14.25 to 14.75
Rails under 3 ft.	21.00 to 21.50
Rails for rolling	19.50 to 20.00
Railroad malleable	21.25 to 21.75

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.50 to $17.00
No. 2 hvy. mltng. steel	14.50 to 15.00
Scrap rails	18.50 to 19.00
New hvy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles	12.50 to 13.00
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Shov. turnings	11.50 to 12.00
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings	10.00 to 10.50
Knuckles & couplers	19.50 to 20.50
Coil & leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 machinery cast	18.50 to 19.00
No. 1 cupola cast	17.50 to 18.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft.	21.50 to 22.00
Cast iron carwheels	17.50 to 18.00
Railroad malleable	19.00 to 19.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$14.00 to $14.50
No. 1 hvy. melting	13.50 to 14.00
No. 2 hvy. melting	12.25 to 12.75
No. 1 locomotive tires	14.75 to 15.25
Misc. stand. sec. rails	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.00 to 9.50
No. 1 busheling	13.00 to 13.50
Cast bor. & turn.	5.00 to 5.50
Machine shop turn.	6.50 to 7.00
Heavy turnings	9.25 to 9.75
Rails for rolling	17.50 to 18.00
Steel car axles	18.50 to 19.00
No. 1 RR wrought	10.00 to 10.50
No. 2 RR wrought	12.50 to 13.00
Steel rails under 3 ft.	18.00 to 18.50
Steel angle bars	14.75 to 15.25
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast	14.75 to 15.25
Railroad malleable	16.00 to 16.50
Breakable cast	14.00 to 14.50
Stove plate	10.50 to 11.00
Grate bars	9.50 to 10.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$12.50 to $13.00
No. 2 hvy. mltng. steel	10.50 to 11.00
Scrap rails for mltng.	17.00 to 17.50
Loose sheet clippings	8.00 to 8.50
Hydrau. b'ndled sheets	12.00 to 12.50
Cast iron borings	3.75 to 4.25
Machine shop turn.	5.00 to 5.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	3.00 to 3.25
Rails for rolling	18.50 to 19.00
No. 1 locomotive tires	14.00 to 14.50
Short rails	19.00 to 19.50
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	16.00 to 16.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	7.75 to 8.25
Stove plate	7.75 to 8.25
Agricul. malleable	12.50 to 13.00
Railroad malleable	15.50 to 16.00
Mixed hvy. cast	13.50 to 14.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$14.50
No. 2 hvy. melting steel	13.50
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft.	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	10.00
Steel axles	18.00
No. 1 RR wrought	14.00
No. 1 cast	$16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. mltng. industrial steel	$13.50 to $14.00
No. 2 hvy. mltng. steel	12.50 to 13.00
Borings and turnings	7.75 to 8.25
Long turnings	8.25 to 8.75
Short shov. turnings	9.25 to 9.75
No. 1 machinery cast	17.00 to 17.50
Automotive cast	16.75 to 17.25
Hvy. breakable cast	14.50 to 15.00
Stove plate	10.75 to 11.25
Hydraul. comp. sheets	14.75 to 15.25
New factory bushel	13.00 to 13.50
Sheet clippings	9.75 to 10.75
Flashings	13.25 to 13.75
Low phos. plate scrap	14.75 to 15.25

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$12.50 to $13.00
No. 2 hvy. mltng. steel	10.50 to 11.00
Hvy. breakable cast	14.00 to 14.50
No. 1 machinery cast	16.00 to 16.50
No. 2 cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Clean steel turnings*	5.00
Cast borings*	5.00 to 5.50
No. 1 blast furnace	5.00 to 5.50
Cast borings (chem.)	Nominal
Unprepared yard scrap	6.50 to 7.00
Light iron	4.50 to 5.00
Per gross ton delivered local foundries:	
No. 1 machin. cast	$17.00 to $18.50
No. 2 cast	16.50 to 17.00

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$13.00 to $13.25
Machine shop turn.	4.90
Mixed bor. & turn.	3.15 to 3.50
Bun. skeleton long	9.40
Shafting	17.00 to 17.25
Stove plate	9.75 to 10.00
Cast bor. chemical	8.00 to 8.50
Per gross ton delivered consumers' yards:	
Textile cast	$15.50 to $17.00
No. 1 machine cast	15.50 to 17.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel	$13.25
No. 2 steel	12.25

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$12.00	$12.00	$11.00
No. 2 hvy. mltng. steel	11.00	11.00	10.00
Bundles	10.00	10.00	9.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$11.50	$11.00
No. 1 hvy. mltng. steel	11.00	10.50
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.00	13.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	$13.50
No. 2 hvy. mltng. steel	$11.50 to 12.00
No. 2 cast	12.00 to 12.50
Stove plate	10.00 to 10.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	$15.00
No. 2 hvy. mltng. steel	14.00
Rail (scrap)	15.00
Stove plate	$8.00 to 8.25
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	$16.00
No. 2 hvy. mltng. steel	14.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are effected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago or Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in. $3 a net ton higher. Quantity extras apply.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.80c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.05c.
On cars dock Tex. Gulf ports	2.40c.
On cars dock Pacific ports	2.70c.

IRON BARS

Chicago (common)	2.25c.
Pittsburgh (refined)	3.75c.
Pittsburgh (wrought iron)	4.40c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.70c. to 1.90c.*
Detroit, delivered	1.80c. to 2.00c.*
On cars dock Tex. Gulf ports	2.20c. to 2.25c.*
On cars dock Pacific ports	2.25c. to 2.30c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham.	1.70c. to 1.90c.*
Detroit, delivered	1.80c. to 2.00c.*
On cars dock Tex. Gulf ports	2.20c. to 2.25c.*
On cars dock Pacific ports	2.25c. to 2.30c.

*** The so-called published price on new billet reinforcing bars is 2.15c. a lb. f.o.b. major basing points and on rail reinforcing bars is 2.00c. a lb. The price range shown above, however, represents the going prices at the present time.**

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

*** In quantities of 20,000 to 39,999 lb.**

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.65c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	4.00c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.75c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.95c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.30c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.10c.
Detroit, delivered	2.20c.
Philadelphia, delivered	2.27c.
Granite City	2.20c.
On cars dock Pacific ports	2.65c.
Wrought iron sheets, Pittsburgh	4.75c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.70c.

*** Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. On May 1, these prices were advanced 0.20c. per lb.**

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, del'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.05c.
Wrought iron sheets, Pittsburgh	7.00c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.55c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, del'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	4.00c.

TIN MILL PRODUCTS

Tin Plate

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary (100 lb.)	$5.00
Standard cokes, Granite City (100 lb.)	5.10

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter*

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.07½c.

*Black plate base price applies to 29 gage within certain width and length limitations.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.10c.
Detroit, delivered	2.20c.
On cars dock Pacific ports	2.75c.

Cooperage Stock

Pittsburgh and Chicago	2.20c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

*** Carbon 0.25 and less.**

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, del'd	3.05c.
Worcester	3.35c.

COLD ROLLED SPRING STEEL

	Pittsburgh and Cleveland	Worcester
Carbon 0.26-0.50%	2.80c.	3.00c.
Carbon 0.51-0.75	4.30c.	4.50c.
Carbon 0.76-1.00	6.15c.	6.35c.
Carbon 1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade	*Per Lb.*
Bright wire	2.60c.
Galvanized wire, bas	2.60c.
Spring wire	3.20c.

To the Trade	*Base per Keg*
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05
Woven wire fence, 15½ gage and heavier base col.	67
Fence posts (carloads), base col.	69
Single loop bale ties, base col.	56
Galvanized barbed wire on 80-rod spools (carloads) base col.	70
Twisted barbless wire, base col.	70

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld Steel

In.	Black	Galv.
⅛	56	36
¼ to ⅜	59	43½
½	....63½	54
¾	....66½	58
1 to 3	....68½	60½

Wrought Iron

In.	Black	Galv.
¼ & ⅜	....+9	+30
½	24	6½
¾	30	13
1 & 1¼	34	19
1½	38	21½
2	....37½	21

Lap Weld

2	61	52½
2½ & 3	64	55½
3½ to 6	66	57½
7 & 8	65	55½
9 & 10	....64½	55
11 & 12	....63½	54
2	....30½	15
2½ to 3½	....31½	17½
4	....33½	21
4½ to 8	....32½	20
9 to 12	....28½	15

Butt weld, extra strong, plain ends

⅛	....54½	41½
¼ to ⅜	....56½	45½
½	....61½	53½
¾	....65½	57½
1 to 3	67	60
¼ & ⅜	....+10	+43
½	25	9
¾	31	15
1 to 2	38	22½

Lap weld, extra strong, plain ends

2	59	51½
2½ & 3	63	55½
3½ to 6	....66½	59
7 & 8	....65½	56
9 & 10	....64½	55
11 & 12	....63½	54
2	....33½	18½
2½ to 4	....39½	25½
4½ to 6	....37½	24
7 & 8	....38½	24½
9 to 12	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.	13 B.W.G. $9.01	$7.82	....
1¼ in. o.d.	13 B.W.G. 10.67	9.26	....
1½ in. o.d.	13 B.W.G. 11.70	10.23	$9.72
1⅝ in. o.d.	13 B.W.G. 13.42	11.64	11.06
2 in. o.d.	13 B.W.G. 15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G. 16.76	14.54	13.79
2½ in. o.d.	12 B.W.G. 18.45	16.01	15.16
2½ in. o.d.	12 B.W.G. 20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G. 21.42	18.59	17.54
3 in. o.d.	12 B.W.G. 22.48	19.50	18.35
3½ in. o.d.	11 B.W.G. 28.37	24.62	23.15
4 in. o.d.	10 B.W.G. 35.20	30.54	28.66
4½ in. o.d.	10 B.W.G. 43.04	37.35	35.22
5 in. o.d.	9 B.W.G. 54.01	46.87	44.25
6 in. o.d.	7 B.W.G. 82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
*6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00
4-in. f.o.b. dock, San Francisco, Los Angeles or Seattle	59.00

Class "A" and gas pipe, $3 extra

4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45. Birmingham, and $53.80 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts: ½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped: ½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. incl.	62
1⅝ in. and larger	60

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

	Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller		67	70
9/16 to 1 in.		64	65
1⅛ in. through 1½ in.		62	62
1⅝ in. and larger		60	60

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose 72½

Stove bolts in packages, with nuts attached, add 15% extra.

Stove bolts in bulk $3½

On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ....65 and 10

Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base 2.70c. Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (1½% Ni)	$0.35
2100 (1½% Ni)	0.75
2300 (3½% Ni)	1.55
2500 (5% Ni)	2.25
31 Ni-Cr	0.70
3200 Ni-Cr	1.85
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
4340 Cr-Ni-Mo	1.65
4345 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.20 to 0.30 Mo 1.50 to 2.00 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr.)	0.45
6100 Cr spring steel	0.15
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip.	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

No. 410	No. 430	No. 442	No. 446
Bars			
18.50c.	19c.	22.50c.	27.50c.
Plates			
21.50c.	22c.	25.50c.	30.50c.
Sheets			
26.50c.	29c.	32.50c.	36.50c.
Hot strip			
17c.	17.50c.	24c.	35c.
Cold strip			
22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON AND FERROALLOYS

No. 2 Foundry

F.o.b. Everett, Mass.	$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, del'd, Cincinnati	23.06
Northern, del'd, Cincinnati	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points; Birdsboro, Pa., Steelton, Pa., and Buffalo	$28.50

Gray Forge

Valley or Pittsburgh furnace	$22.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$27.50 base
Malleable	28.00 base
Basic	27.50 base
Toronto	
Foundry iron	$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots, packed)	82.00*
75% (carload lots, bulk	126.00*
75% (ton lots, packed)	142.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon ..... 11.00c.
2% carbon ..... 17.50c.
1% carbon ..... 18.50c.
0.10% carbon ..... 20.50c.
0.06% carbon ..... 21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size. Bulk, on Contract

3% carbon $98.00*
2.50% carbon 103.00*
2% carbon 108.00*
1% carbon 118.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carload $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton $142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton $157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton $58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville $75.00
Ferromolybdenum, per lb. Mo f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo per lb. contained Mo f.o.b. Langeloth, Pa. ..... 80c.

*Spot prices are $5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50% $4.75
Old range, non-bessemer, 51.50% 4.60
Mesaba, bessemer, 51.50% 4.60
Mesaba, non-bessemer, 51.50% 4.45
High phosphorus, 51.50%. 4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe .... 14c.
Caucasian, washed, 52% Mn ..... 50c.
African, Indian, 44 to 48% Mn ..... 46c.
African, Indian, 49 to 51% Mn ..... 49c.
Brazilian, 46 to 48% Mn. 47c.
Cuban, del'd, duty free, 51% Mn ..... 62c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered ..... $23.00 to $23.50
Tungsten, domestic scheelite del'd..... 23.00 to 23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade) $19.00
Rhodesian, 45% 22.00
Rhodesian, 48% 26.00 to 27.00

*All foreign ore prices are nominal. War conditions have prevented trading in Swedish and Turkish ores and all quotations have therefore been withdrawn.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail $20.00
Domestic, f.o.b. Ohio River landing barges.. 20.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines ..... $20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid $25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines $31.00
ditto, in bags, f.o.b., same mines $32.60

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J. ..... 5.40c.
No. 6, f.o.b. Bayonne, N. J. ..... 3.57c.
No. 5 Bur. Stds., del'd Chicago ..... 3.25c.
No. 6 Bur. Stds., del'd Chicago ..... 2.75c.
No. 3 distillate, del'd Cleveland ..... 5.25c.
No. 4 industrial, del'd Cleveland ..... 5.00c.
No. 5 industrial, del'd Cleveland ..... 3.75c.
No. 6 industrial, del'd Cleveland ..... 3.25c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt ..... $4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt ..... $5.25 to $5.50
Foundry, by-product Chicago ovens $10.50
Foundry, by-product delivered New England $12.50
Foundry, by-product delivered Newark or Jersey City, $11.38 to $11.90
Foundry, by-product Philadelphia $11.13
Foundry, by-product delivered Cleveland $11.05
Foundry, by-product delivered Cincinnati $10.50
Foundry, Birmingham...$7.50
Foundry, by-product delivered St. Louis industrial district ..... $10.75 to $11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports $14.75

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis $60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois 47.50
First quality, New Jersey 52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 42.75
Second quality, New Jersey 49.00
No. 1 Ohio 39.90
Ground fire clay, per ton 7.10

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania $47.50
Chicago District 55.10
Birmingham 47.50
Silica cement per net ton (Eastern) 8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester $50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 50.00

Magnesite Brick

Net per Ton

Standard f.o.b. Baltimore and Chester $72.00
Chemically bonded, f.o.b. Baltimore 61.00

Grain Magnesite

Net per Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) ..... (—)*
Domestic, f.o.b. Baltimore and Chester in sacks.. 40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) .. 22.00

* None available.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export ..... £17 18s.
Tin plate, per base box ..... 32s. to 33s.
Steel bars, open hearth ..... 13£ 9s.
Beams, open hearth 12£ 2s. 6d.
Channels, open hearth ..... 12£ 2s. 6d.
Angles, open hearth 12£ 2s. 6d.
Black sheets, No. 24 gage 17£ max.*; 17£ min.**
Galvanized sheets, No. 24 gage 19£ 10s. max.*; 19£ 10s. min.**

* Empire markets only.
** Other than Empire markets.

CONTINENTAL

Per Gross Ton, Belgian Francs
f.o.b. Continental Ports

Bars, merchant 1500
Plates 1750
Joists 1475
Sheets, thin 1900

Above prices are minimum base to which 100 francs should be added to cover war risk insurance, freight charges, etc.

WAREHOUSE PRICES

Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	St. Louis	St. Paul	Milwaukee
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.18	$3.60	$3.48
Sheets, cold rolled	...	4.10	4.05	4.35	4.40	4.30	4.30	4.58	4.12	4.95	4.43
Sheets, galv.	4.75	4.60	4.72	5.00	4.50	4.84	4.45	4.66	4.95	5.00	4.98
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48	3.62	3.86	3.52	...	2.73
Strip, cold rolled	3.00	3.30	3.20	3.31	3.31	3.20	3.22	3.26	3.41	3.83	3.54
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.47	3.80	3.68
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.47	3.80	3.68
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.62	3.75	3.63
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.02	4.34	3.88
Bars, hot rolled SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	7.47	7.45	7.33
Bars, hot rolled SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	6.02	6.00	5.88
Bars, cold drawn SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	8.52	8.84	8.38
Bars, cold drawn SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	7.12	7.44	6.98

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, less than 1500 lb., cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., galvanized sheets, any quantity, cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb. Extras for size, quality, etc., apply on above quotations.

. . . NON-FERROUS . . .

. . . Tin prices higher as demands increase . . . Lead reduced $2 a ton, but buying lags . . . Copper and zinc quiet.

NEW YORK, May 7—With export buying pretty well dried up and domestic consumers showing little interest, the market for copper goes its quiet way with little in prospect for the near future. Sales in the first four days of May totaled 5367 tons. As of today, mine producers continue to quote 11.50c. a lb. for the red metal and leading smelting interests are holding to the 11.125c. level. With little demand from abroad, export quotations have fallen to 11.10c. for spot metal and 11.05c., or possibly lower, for June and July metal. There is a growing belief that in view of the generally unsatisfactory condition of the present market that drastic curtailment in output is imperative if the present price structure is to be maintained. However, the market is watching domestic developments and war changes abroad very closely to determine any factors which can quickly alter the present situation. Yesterday, producers of brass ingots announced a uniform reduction of ⅛c. per lb. on all mixtures.

Zinc

Several days over the past week were characterized by minor improvements in activity, but the market as a whole remains quiet and without significant developments. None the less, the price structure is holding remarkably firm at the 5.75c. a lb., East St. Louis, level. With steel operations again on the rise, sellers of zinc are looking forward to improved galvanizing operations which will in turn be reflected in a pick-up in spelter sales. Prime Western sales last week totaled 1285 tons, of which only 410 tons was sold on a flat price of 5.75c., the remainder going on an average price basis. Of the prime Western sales, 240 tons was for April delivery, the remainder being for May shipment. This is indicative of the close buying now typical of the market, with consumers not inclined to take forward positions. Shipments during the week totaled 3400 tons, and undelivered orders now stand at 38,871 tons.

Lead

Yesterday, the American Smelting & Refining Co. reduced its contract basing price $2 a ton to a 5c. a lb. New York basis. This action occasioned little surprise as business has not been sufficient to absorb intake and the accumulation of unsold metal has been piling up. At first the price reduction created little interest, but today consumers have been more active. About 80 per cent of the May position is sold but only 25 per cent of June is covered, indicating that considerable buying for the latter month is in order over the next few weeks.

Tin

The tin market was enlivened last week by a Government order for 1900 gross tons, and there has followed a moderately active general demand, based most likely on improved sentiment caused by the climbing steel-making rate. Tin plate producers particularly seem inclined to build up better stocks. The price for Straits metal in New York today was in the neighborhood of 47.625c. a lb., and the London market on first call showed spot metal at £255 and three-months metal at £252 15s.

NON-FERROUS PRICES

Cents per lb. for early delivery

	May 1	May 2	May 3	May 4	May 6	May 7
Copper, Electrolytic[1]*	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	47.25	47.375	47.375	....	47.125	47.625
Zinc, East St. Louis[2]	5.75	5.75	5.75	5.75	5.75	5.75
Lead, St. Louis[3]	4.95	4.95	4.95	4.95	4.85	4.85

* Mine producers' quotations only.
[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	48.25c.	50.50c.
Copper, Lake	13.25c.	12.625c.
Copper, electro	12.75c.	12.625c.
Copper, castings	12.375c.	12.375c.
*Copper sheets, hot-rolled	20.12c.	20.12c.
*Yellow brass sheets	18.31c.	18.31c.
*Seamless brass tubes	21.06c.	21.06c.
*Seamless copper tubes	20.62c.	20.62c.
*Yellow brass rods	14.26c.	14.26c.
Zinc slabs	7.10c.	7.75c.
Zinc sheets, No. 9 casks	12.00c.	13.35c.
Lead, American pig	6.10c.	5.50c.
Lead, bar	8.05c.	8.25c.
Lead, sheets, cut	8.25c.	8.25c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	20.50c.	21.50c.
Alum., No. 1 remelt., 98 to 99 per cent	18.00c.	18.50c.
Solder, ½ and ½	29.90c.	29.00c.
Babbitt metal, anti-friction grade	19.85c.	19.00c.

***These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.**

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.00c.	9.625c.
Copper, hvy. and wire	8.00c.	8.375c.
Copper, light and bottoms	7.125c.	7.625c.
Brass, heavy	4.875c.	5.375c.
Brass, light	4.00c.	4.75c.
Heavy machine composition	7.50c.	8.125c.
No. 1 yel. brass turnings	4.75c.	5.75c.
No. 1 red brass or compos. turnings	7.125c.	8.625c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	7.75c.	8.75c.
Sheet aluminum	13.00c.	14.00c.
Zinc	3.00c.	3.75c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $174 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

Vincent Steel Process Co. Installs New Furnaces

DETROIT—The Vincent Steel Process Co., 2434 Bellevue Avenue, is installing two new heat treating furnaces to be used principally for automotive production work. The firm is adding another building of 2000 sq. ft. to its present heat treating plant. One of the furnaces is a continuous type with gas heat designed by Vincent engineers. A 36-in. wide belt and conveyor, supplied by General Alloys Co. will carry parts through the heat-treat and normalizing and quenching. The other furnace is a Bellevue furnace design for heat-treating bars up to 20 ft. long. This furnace is oil heated. With the new equipment, the plant will have a capacity for handling 125 tons of work daily, according to G. Jeakle, president.

FABRICATED STEEL

. . . Lettings advance to 11,400 tons from 6700 tons last week . . . New projects higher at 17,000 tons . . . Plate awards only 310 tons.

AWARDS

NORTH ATLANTIC STATES

700 **Tons,** Bethesda, Md., Naval Medical Center buildings, to Bethlehem Steel Co., Bethlehem, Pa.

690 **Tons,** Hartford, Conn., addition to Connecticut Mutual Life Insurance Co., to Harris Structural Steel Co., Plainfield, N. J.

540 **Tons,** Morris County, N. J., Delaware, Lackawanna & Western Railroad bridge, to Bethlehem Steel Co., Bethlehem, Pa.

500 **Tons,** Rochester, N. Y., State bridge, to American Bridge Co., Pittsburgh.

410 **Tons,** Oswego, N. Y., Central New York Power Corp. coal handling system, to Lackawanna Steel Construction Corp., Buffalo.

250 **Tons,** South Boston, New England Greyhound Lines bus storage plant, to American Bridge Co., Pittsburgh.

220 **Tons,** Astoria, N. Y., Morey machine shop, to Jones & Laughlin Steel Corp., Pittsburgh.

200 **Tons,** Massena, N. Y., plant extension for Aluminum Co. of America, to Lackawanna Steel Construction Corp., Buffalo.

200 **Tons,** Springfield, Vt., Jones & Lamson Machine Co., factory building, to American Bridge Co., Pittsburgh.

200 **Tons,** Washington, Longfellow building, to Bethlehem Steel Co., Bethlehem, Pa.

180 **Tons,** Baltimore, plant for Rheem Mfg. Co., to Bethlehem Steel Co., Bethlehem, Pa.

170 **Tons,** Malden, Mass., F. W. Woolworth Co. store, to A. O. Wilson Structural Co., Cambridge, Mass.

125 **Tons,** Newark, Del., biochemical research laboratory, to Belmont Iron Works, Philadelphia.

120 **Tons,** Medford, N. Y., State bridge, to American Bridge Co., Pittsburgh.

100 **Tons,** Amherst, Mass., women's college dormitory, to Haarmann Steel Co., Holyoke, Mass.

THE SOUTH

210 **Tons,** Ivanhoe, Va., National Carbide Corp. furnace building extension, to Carolina Steel & Iron Co., Greensboro, N. C.

170 **Tons,** Fannin County, Tex., bridge, to Virginia Bridge Co., Roanoke, Va.

170 **Tons,** Shreveport, La., armory, to J. B. Beaird Corp., Shreveport.

105 **Tons,** Coleman County, Tex., bridge, to Peden Iron & Steel Co., Houston, Tex.

CENTRAL STATES

1325 **Tons,** Youngstown, rebuilding blast furnace, precipitator and gas mains, to William B. Pollock Co., Youngstown.

750 **Tons,** Toledo, Ohio, City Machine & Tool Co. factory, building, to R. C. Mahon Co., Detroit.

600 **Tons,** Anderson, Ind., building for Guide Lamp Co., to Indiana Bridge Co., Muncie, Ind.

520 **Tons,** Streator, Ill., extension to warehouses and load platform, Owens-Illinois Glass Co., to Bethlehem Steel Co., Bethlehem, Pa.

422 **Tons,** Kansas City, bridge over Blue River, to Kansas City Structural Steel Co., Kansas City, Kan.

350 **Tons,** Youngstown, mill buildings for General Fireproofing Co., to Bethlehem Steel Co., Bethlehem, Pa., through Gillmore, Carmichael, Olson Co., general contractor.

280 **Tons,** Chase County, Kan., State highway bridge, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

264 **Tons,** Neosho Rapids, Kan., State highway bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

240 **Tons,** Clarks, Neb., State viaduct, to St. Joseph Structural Steel Co., St. Joseph, Mo.

170 **Tons,** Dearborn, Mich., theater, to R. C. Mahon Co., Detroit.

159 **Tons,** Harristown, Ill., State highway bridge, section 404-F, to Mississippi Valley Structural Steel Co., Decatur, Ill.

150 **Tons,** East Chicago, Ind., building, Metal & Thermit Corp., to Joseph T. Ryerson & Son, Inc., Chicago, through Austin Co., Cleveland.

120 **Tons,** Detroit, addition to Ternstedt Division, General Motors Co., to American Bridge Co., Pittsburgh.

115 **Tons,** Monroe Township, Ohio, bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

113 **Tons,** Chicago, building, Alco Gravure Co., to Joseph T. Ryerson & Son, Inc., Chicago.

110 **Tons,** Harrison County, Ohio, State project No. 30, to Fort Pitt Bridge Works Co., Massillon, Ohio, through W. M. Brode, Newcomerstown, general contractor.

WESTERN STATES

451 **Tons,** Denver, bridge over Sand Creek, to Midwest Steel & Iron Works Co., Denver.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

2500 **Tons,** Washington, first unit of armory for District of Columbia.

1500 **Tons,** New York, land plane hangar No. 8, North Beach Airport.

1200 **Tons,** North Adams, Mass., State bridge.

900 **Tons,** New York, public school No. 99 in Bronx.

460 **Tons,** Erie County, Pa., highway overpass.

330 **Tons,** Wilmington, Del., plant and office building for Eastern States Farmers' Exchange.

175 **Tons,** West New Brighton, Staten Island, N. Y., public school No. 30.

150 **Tons,** Bellevue, D. C., gun racks for Navy Department.

125 **Tons,** Oneonta, N. Y., building for W. H. Hofman.

115 **Tons,** York, Pa., fabricated joists, Murphy store.

THE SOUTH

2500 **Tons,** Narrows, Va., building for Celanese Corp.

1000 **Tons,** State of Georgia, beam bridges.

645 **Tons,** State of Arkansas, four highway bridges; bids, May 9.

270 **Tons,** Richmond, Va., repairs to viaduct for Chesapeake & Ohio Railroad.

175 **Tons,** Louisville, Ky., extraction and preparation buildings for Buckeye Cotton Oil Co.

CENTRAL STATES

1700 **Tons,** Lafayette, Ind., extension to building No. 16 for Aluminum Co. of America.

718 **Tons,** Kanapolis, Kan., dam, U. S. Engineer's Office, Kansas City; bids May 10.

450 **Tons,** East St. Louis, Ill., factory for O'Bear-Nester Glass Co., George A. Barnes, East St. Louis, general contractor.

450 **Tons,** Mississippi River guide wall extensions, locks and dams Nos. 11, 16, 18, 20, 21; bids by U. S. Engineers at Rock Island, Ill., postponed to May 17.

280 **Tons,** State of South Dakota, highway bridge, bids May 14 by State Highway Department at Pierre.

225 **Tons,** Oglesby, Ill., State highway bridge, bids May 10 at Springfield.

220 **Tons,** Canton, Ohio, annealing furnace building for Timken Roller Bearing Co.

165 **Tons,** Murphysboro, Ill., Illinois Central Railroad bridge.

150 **Tons,** Conneaut, Ohio, State grade crossing; bids May 17.

130 **Tons,** Norwood, Ohio, building for Chevrolet Motor Co.

125 **Tons,** Oak Hill, Ohio, State project No. 53; bids May 17.

120 **Tons,** Marion, Ohio, power station extension for Marion Reserve Power Co.

112 **Tons,** Rossville, Ill., State highway bridge; bids May 10.

WESTERN STATES

600 **Tons,** Fairbanks, Alaska, warehouse and structures for air base. Invitation QM 6808-40-104; bids May 16.

365 **Tons,** Los Angeles, Union Pacific Railroad bridge for U. S. Engineers.

350 **Tons,** Friant, Cal., embedded metalwork, Specification 1358-D, for Bureau of Reclamation.

330 **Tons,** Friant, Cal., pier plates and trusses, Specification 1362-D, for Bureau of Reclamation.

220 **Tons,** Knightsen, Cal., headworks structure, Specification 1360-D, for Bureau of Reclamation.

220 **Tons,** Odair, Wash., crane tracks for Bureau of Reclamation, Specification 1365-D.

175 **Tons,** The Dalles, Ore., Tandem Canal locks for U. S. Engineer, Bonneville, Ore.; bids May 29.

130 **Tons,** Alaska, Indian River bridge for Alaska Railroad.

FABRICATED PLATES

AWARDS

310 **Tons,** Bradford, N. Y., tanks for Kendall Refining Co., to Hammond Iron Works, Warren, Pa.

SHEET PILING

PENDING PROJECTS

175,950 **sq. ft.,** Mississippi River guide wall extensions, locks and dams Nos. 11, 16, 18, 20, 21; bids by U. S. Engineers, Rock Island, Ill., postponed to May 17.

800 **Tons,** Brookport, Ill., flood control work along Ohio River; bids June 1, U. S. Engineer's Office at Louisville, Ky.

300 **Tons,** North Adams, Mass., State bridge.

144 **Tons,** Golconda, Ill., flood control work along Ohio River; bids May 28, U. S. Engineer's Office at Louisville, Ky.

120 **Tons,** Mississippi River flood protection; bids May 31.

. . . PIPE LINES . . .

Union Oil Co., Union Oil Building, Los Angeles, plans new 12¾-in. welded steel pipe line from pumping station at Battles tank farm, near Santa Maria, to connection with system at Suey Junction, for oil transmission. It will replace an existing 8⅝-in. pipe line between these points.

Bureau of Reclamation, Denver, will receive bids until May 17 for two 72-in. diameter welded steel pipe lines, with 57-in. diameter downstream pipe branches, for installation in outlet works at Deer Creek dam, Provo River project, Utah (Specifications 1363-D).

Morton, Ill., plans natural gas steel pipe line system, including main welded steel pipe line for connection with transmission line of Panhandle Eastern Pipe Line Co., which will furnish supply. Project will include control station, meter house and other operating facilities. L. B. Kinsey, 512 Court Street, Pekin, Ill., is consulting engineer.

Peoples Water & Gas Co., Hollywood, Fla., plans pressure pipe line extensions in gas distributing system in residental districts. Cost over $40,000.

Tennessee Gas & Transmission Co., Chattanooga, Tenn., Curtis B. Dall, president, recently organized, has applied to Federal Power Commission for permission to build new welded steel pipe line from gas field in northern part of Louisiana to Chattanooga, Nashville and Knoxville, Tenn., for natural gas transmission. Branch lines will be built to other municipalities along routes, where it is proposed to furnish service. Distribution lines will be installed in various cities and towns, with control stations, meter houses and other operating facilities.

King County Water District No. 45, William Beyers, 3801 Youngstown Place, Seattle, secretary, will take bids soon for 2 to 6-in. steel pipe, wrapped and dipped, for extensions and replacements in water system. Edward Hughes, County-City Building, Seattle, is consulting engineer.

Metropolitan Water District, 306 West Third Street, Los Angeles, closes bids May 14 for section of pipe line for main water supply, from west end of San Rafael tunnel No. 2, Glenoaks Boulevard, Glendale, to point near city limits on Kenneth Road, Burbank, Cal., about 6.8 miles. Quotations will be received

for three alternative types of pipe lines as follows: 12,400 ft. of 58-in. lock-joint, steel cylinder, reinforced precast concrete pipe, with standard lock joints; and 830 ft. of similar pipe, welded lock joints (Schedule 29-P); 13,257 ft. of 59-in. welded steel pipe, with gunite exterior coating and centrifugally applied (spun) mortar lining (Schedule 29-SC); 22,525 ft. of 48-in. similar pipe, ⅜-in. thick in both cases (Schedule 30-SC); 13,257 ft. of 60-in., coal-tar enamel-lined steel pipe, ⅜-in. thick (Schedule 29-SE); and 22,525 ft. of 50-in. similar pipe (Schedule 29-SE). Also for 16,000 lb. steel manhole assemblies, quantity of steel plate specials, and for cast iron pipe for sewer reconstruction, including 2600 lin. ft. of 6-in., 990 lin. ft. of 8-in., 50 lin. ft. of 10-in., and 70 lin. ft. of 12-in.

General Purchasing Officer, Panama Canal, Washington, asks bids until May 20 for 7200 ft. of welded steel pipe, and 7100 ft. of galvanized steel pipe (Schedule 4036).

REINFORCING STEEL

. . . Awards of 4225 tons; 6930 tons in new projects

AWARDS

ATLANTIC STATES

1700 Tons, Bethesda, Md., Naval Medical Center, to Bethlehem Steel Co., Bethlehem, Pa.; John McShain, contractor.

800 Tons, Washington, Longfellow building to Bethlehem Steel Co., Bethlehem, Pa.; John McShain, contractor.

200 Tons, Queens, N. Y., sewers, to Igoe Brothers, New York, through Tomasetti Construction Co.

CENTRAL STATES

445 Tons, Evanston, Ill., substructure, Northwestern University Technological Institute, to Joseph T. Ryerson & Son, Inc., Chicago, through R. C. Wieboldt Co., Chicago.

265 Tons, Kansas City, Manchester Avenue bridge, to Sheffield Steel Corp., Kansas City.

250 Tons, Kansas City, Mo., Manchester Avenue bridge, to Sheffield Steel Co., Kansas City.

180 Tons, Brown and Clearmont Counties, Ohio State Highway Department project No. 26, to Truscon Steel Co., Youngstown.

180 Tons, Cedar Rapids, Iowa, Hubbard Ice & Fuel Co. building, to Laclede Steel Co., St. Louis.

100 Tons, Cleveland, Home for Aged, to Patterson-Leitch Co., Cleveland.

CUBA

100 Tons, Havana, United States embassy building, to Youngstown Sheet & Tube Co., Youngstown.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

500 Tons, Johnstown, Pa., flood control project, unit 4.

370 Tons, North Adams, Mass., State bridge.

350 Tons, Fall River, Mass., housing project.

300 Tons, Mountain Lake, N. J., Delaware, Lackawanna & Western Railroad bridge.

180 Tons, Washington, Weather Bureau building.

SOUTH AND CENTRAL

1700 Tons, Evanston, Ill., superstructure, Northwestern University Technological Institute, R. C. Wieboldt Co., Chicago, contractor.

1250 Tons, Mississippi River guide wall extensions, locks and dams Nos. 11, 16, 18, 20, 21; bids by U. S. Engineers, Rock Island, Ill., postponed to May 17.

855 Tons, Newkirk, N. M., Tucumcari project (Invitation 32801-A); bids in.

460 Tons, Conneaut, Ohio, State grade crossing; bids May 17.

300 Tons, Cleveland, store addition for Sears, Roebuck & Co.

227 Tons, State of Arkansas, four highway bridges; bids May 9.

170 Tons, Owen County, Ky., highway project, SP-94-233, bids May 8.

166 Tons, Montgomery County, Ky., highway project FAGM-158-F.

135 Tons, Golconda, Ill., flood protection work along Ohio River; bids May 28, United States Engineers office at Louisville, Ky. (This item reported last week as a Mississippi River project.)

116 Tons, Brookport, Ill., flood control work along Ohio River; bids June 1, United States Engineers office at Louisville, Ky.

100 Tons, Muncie, Ind., flood control work; bids May 28 at United States Engineers office, Louisville, Ky.

WESTERN STATES

525 Tons, Los Angeles, Cal., mesh reinforcement, Metropolitan Water District; bids, May 21.

500 Tons, Walla Walla, Wash., Mill Creek Dam for U. S. Engineer, Bonneville; bids, May 9.

100 Tons, San Diego, Cal., Bonita State highway bridge; bids, May 24.

CAST IRON PIPE

Waltham, Mass., has placed its 1940 requirements with Warren Foundry & Pipe Corp.

Sudbury, Mass., will close bids May 10 on 3600 ft. of pipe. Fay, Spofford & Thorndike, Boston, are engineers.

Charlton, Mass., has tentative plans for one and a half miles of 6 and 8-in. water mains, pumping station and standpipe.

Palestine, Tex., plans pipe lines for water system; also other waterworks installation, including pumping machinery for deep-well service and accessories. Bond issue of $85,000 has been authorized.

Magnolia, N. C., plans water pipe line system, and other waterworks installation. A bond issue of $32,000 is being arranged. Work is scheduled to be carried out this spring.

Elizabeth Township Commissioners, Municipal Building, Elizabeth, Pa., plan early purchase of about 25 miles, various sizes, for water system; also 500,000-gal. filtration plant and other waterworks installation. Cost about $600,000. Chester Engineers, Inc., 210 East Parkway, N.S., Pittsburgh, is consulting engineer.

Area Chief Clerk, Soil Conservation Service, Department of Agriculture, Bath, N. Y., asks bids until May 14 for cast iron water pipe for system at Big Flats, N. Y.; also for pipe fittings, foot valves, etc. (Proposal NY-C-A-1-38).

Dunkerton, Iowa, plans water pipe line system and other waterworks installation. E. E. Schank, Waterloo Building, Waterloo, Iowa, is consulting engineer.

Flagstaff, Ariz., plans water pipe line extensions and replacements; also new water-treatment plant, pumping machinery and other waterworks equipment. Cost about $255,000. Application has been made to RFC for loan of $180,000 as part of required fund.

Olathe, Colo., plans about 8000 ft. of cast iron pipe for main water line, replacing present wood stave pipe. Cost about $61,300. Financing is being arranged through Federal aid.

Somerset, Ohio, plans pipe line extensions in water system and other waterworks installation, including reservoir and filtration plant. Cost about $100,000. Bond issue for $15,000 will be voted at election May 14, remainder of fund to be secured through Federal aid. Burgess & Niple, 568 East Broad Street, Columbus, Ohio, are consulting engineers.

First Chrome Plated Gage Blocks Little Worn

DETROIT—The service record of the original commercial set of chrome plated gage blocks reveals nearly three years of daily use without replacement, according to Dearborn Gage Co., originator of the practice of chrome plating new and reconditioned sets or blocks. This original set of blocks, owned by Lincoln Tool & Die Co., Detroit, was plated and refinished early in 1937 after the standards had served their normal life period. After plating and refinishing, the blocks were used thereafter in the grinding department and other parts of the plant daily until early this year.

Recheck of the standards then showed negligible wear of most blocks, with 90 per cent of the blocks still within their original tolerance of plus or minus eight millionths of an inch. At this time blocks in error more than the specified amount were replaced and the set continued in service. The standards are used as tools in regular production checking according to the Lincoln Tool and Die Co.

TNEC Hearings Are Postponed to November

WASHINGTON — Senator O'Mahoney, chairman of the Temporary National Economic Committee, announced on Tuesday that the committee expects to hear the Federal Trade Commission next November in a presentation on the operation of short line railroads by large corporations. This official statement confirms reports that the commission was preparing to submit a report to the TNEC regarding allowances and divisions made to steel-owned and other industry-owned carriers by trunk line carriers.

The TNEC postponed further hearings until November, concluding with a so-called economic forum, which may continue into December.

Allis-Chalmers Mfg. Co., Milwaukee, reports a net income for the first quarter of 1940 of $969,869 as compared with $710,277 for the corresponding quarter a year ago. Unfilled orders as of March 31, 1940, totaled $21,313,400 as against $12,367,519 a year ago and $19,730,594 at the close of 1939. Total employees at the end of the March quarter amounted to 14,340 against 12,839 at the end of March, 1939, and 14,456 December 31, 1939.

General American Transportation Corp., Chicago, in the first quarter this year earned a net profit of $1,241,662 as compared with $535,546 in the March quarter of the previous year.

THIS WEEK'S MACHINE ..TOOL ACTIVITIES...

. . . New orders from aircraft companies will run into millions of dollars . . . Foreign buyers scouring markets for good used tools . . . Illinois Department of Finance rules that retailers' occupation tax must be paid on sales of machine tools.

Pace of Aircraft Buying Quickens in the East

NEW YORK—Release of orders for machine tools from the aircraft industry increased in volume last week, and, although the total programs are estimated at only half of what they were last fall, they will run into millions of dollars. There has also been signs of activity among aircraft parts makers as well as the principal engine builders. Except for what was reported last week, new munitions business for the belligerents continues in the talk stage, although there is little doubt that more shell business will be placed here. General buying is spotty. Some dealers report little in the way of sales other than what is coming directly as a result of war activity. Others, on the contrary, point to a wide diversity of single tool orders from scattered industrial lines. Initial orders from the aircraft companies have not been entered as April business, since written confirmations have been delayed; nevertheless, the April volume for the latter class of dealers has been very satisfactory, and the present volume of inquiries points to a good May volume of sales, above the war business.

Used Machine Tools in Demand by Foreign Buyers

CINCINNATI — The local machinery market shows no change from last week. Lathe ordering is a trifle more active, but this is offset by easing on one or two other lines. Allied purchasing of tools continues reasonably active, while other foreign interests are displaying continued interest in machinery. The used machinery market is busy since some foreign interests are purchasing any usable machinery on which shipments may be obtained promptly. In fact, isolated reports of sales approaching new machinery prices have been reported. Inquiry generally is undiminished, although delivery possibilities are being stressed.

Factory operations are undiminished. All available skilled labor is being employed. Apprentice training is being pressed as rapidly as possible.

Machine Tools in Illinois Must Pay Retailers' Tax

CHICAGO—Last week in this paragraph it was reported that the machine tool trade in this district was awaiting with interest the decision of the State Department of Finance, as to whether a direct sale from an out-of-state factory to an Illinois buyer, uninfluenced by an Illinois sales agent, would be exempt from the 3 per cent retailers occupation tax. The attorneys of the Federal Machinery Sales Corp., Chicago, have received a reply from the department which reads as follows:

"Certain manufacturers of machine tools with plants outside of the State of Illinois maintain sales organizations of their own in the State or in other instances do not maintain permanent agents or offices in the State, but have salesmen call on customers in the State of Illinois soliciting business. Subsequently, such manufacturers receive orders from Illinois customers which were not obtained by such salesmen or solicited by them, although in some instances the orders are obtained as a result of the efforts of such salesmen either in whole or in part. You further state that such orders become binding when accepted at the home office of these companies and the machine tools are then delivered f.o.b. point of origin (outside the State of Illinois), are billed and collected from the home office, freight charges are paid by, and the risk of damage in transit is assumed by the Illinois customer.

"You are advised that it is the opinion of this office that all of the above types of transactions come within the provisions of the Retailers' Occupation Tax Act as it appears that the transfer of the ownership of the tangible personal property occurs in the State of Illinois. While it may be true that transfer of technical title occurs outside the State of Illinois, it is immaterial whether the shipment is made f.o.b. point of origin or f.o.b. destination as actual physical possession is transferred to the buyer in this State."

It now appears that until such time as a test case comes up in the courts, that the 3 per cent tax will apply to all machine tools sold in the State of Illinois whether the sale is direct or indirect.

There is no doubt that in some sales offices here, the tax problem has held up the closing of some business. Now that this last avenue of escape has been blocked by the finance department ruling, business is expected to resume its normal course. Varying reports have been heard here regarding April experience in the machine tool trade. One sales office reports a 25 per cent improvement in unit sales in April as compared with March, while the dollar volume was the highest this year. Distribution was quite good and no particular industry was represented to excess in the list of orders booked by this particular company. It is worthy of note that the agricultural implement industry, normally one of the largest supports of the machine tool business here, is virtually out of the market at the present time but that in spite of this, business is still highly satisfactory. This same company, incidentally, already in May has taken half as much business as was booked in all of March.

Another sales office, however, has experienced a 40 per cent decrease in sales of small tools and orders were light also for machine tools. Inquiries are in fair volume, however, and the early part of May has brought an improvement in the small tool sales. The Army Ordnance Department is still placing educational orders in this district and numerous machine tools are being purchased by various plants here for that purpose.

Cleveland Tool Orders Are Widely Diversified

CLEVELAND—The volume of single machine sales is fair and includes a broad cross-section of industries, while large scale projects are not entirely lacking. A downstate press manufacturer has ordered considerable equipment for fall delivery for a new addition, it is reported. At Toledo the Chevrolet branch has been buying machines for 1941 model production. A Detroit pump manufacturer is understood to be contemplating a good-sized addition.

Planers have been moving well, recent sales including a large one for an Alliance company. White Motor Co., which has a large backlog of truck orders, is buying some equipment. Makers of heavy construction machines and forgers are buying single machines. Prospects are good for users of cutting, piercing and forming equipment. The machine tool industry itself continues to buy generously. Electrical equipment companies are in the market pretty steadily.

Used machinery markets are becoming tighter and tighter in this vicinity, due to persistent foreign demand. In addition to the strong call for millers, heavy duty turret lathes and small screw machines are moving out of the district.

TRADE NOTES

American Forging & Socket Co., Pontiac, Mich., has declared a dividend of 12½c. a share, payable June 1, to stock of record May 20.

Pressed Steel Car Co., Pittsburgh, has moved its office from 2515 Grant Building to 2500 Koppers Building.

Campbell Transportation Co., here, has moved its offices from the Granite Building to 3113 Grant Building, Grant Street.

Barker Steel Co., formerly of Cambridge, Mass., has moved its office and warehouse to 42 School Street, Watertown, Mass.

Building Specialties Co., 859 Boylston Street, Boston, is now agent for Durabilt Steel Locker Co., Empire Door Co., Inc., Flush-Metal Partition Corp., Superior Fireproof Sash & Door Co., and J. S. Thorn Co.

Acheson Colloids Corp., Port Huron, Mich., announces that effective May 1, Raymond Szymanowitz, technical director, and his staff, will be located at 1019 Broad Street, Newark, N. J., new research laboratories for this company.

Peninsular Steel Co. announces removal of its office and warehouse to a new building at 222 Lakeside Avenue, Cleveland.

P&J 5-D POWER-FLEX

Modern

FEATURES INSURE MAINTENANCE OF HIGH ACCURACY ON AUTOMATIC CHUCKING WORK

The great flexibility and high productive capacity offered by the 5-D P&J automatic chucking and turning machine are achieved by features of design and construction which are the results of forty years specialized experience.

A few of these features are described here and contribute to an output per spindle which insures a minimum cost of producing duplicate parts. Power, great rigidity, four automatic changes of spindle speed under cut, powerful direct cross slide action and other advantages are offered which insure maintenance of high accuracy and economy in high production.

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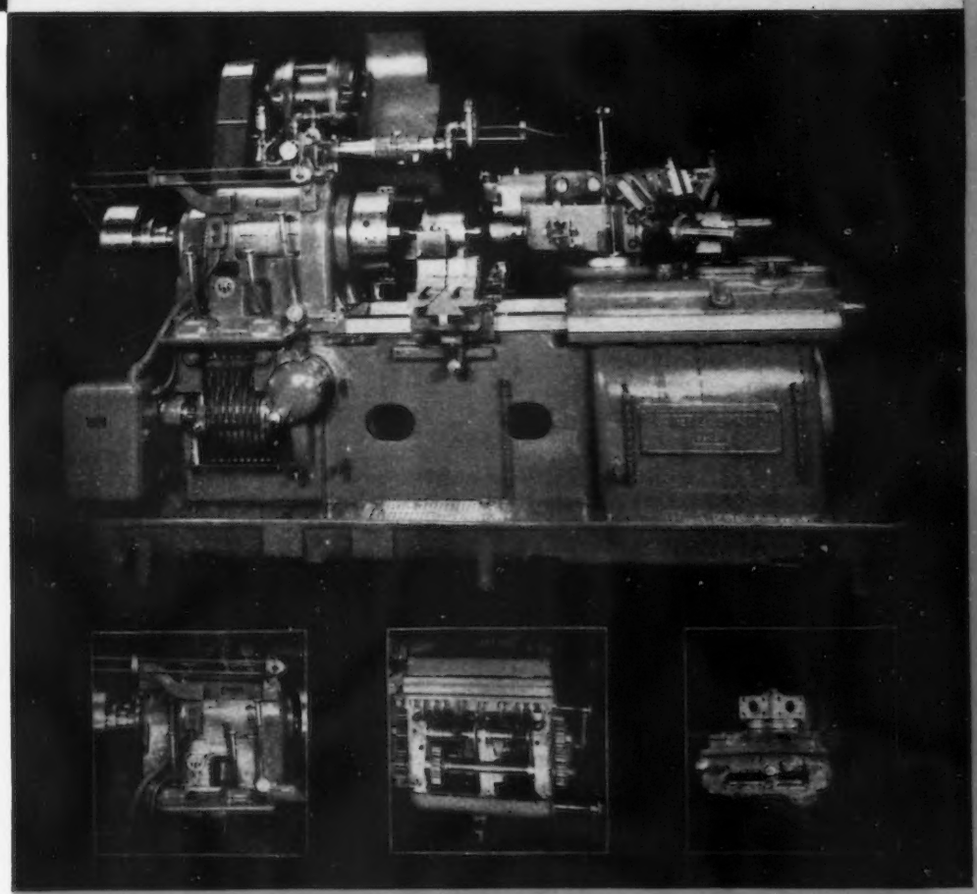
You'll find P&J POWER-FLEX construction clearly illustrated and fully described in Bulletin No. 108. Ask for a copy.



HEADSTOCK UNIT—The flexibility of the 5-D Power Flex for the economical handling of all work within its range is provided by twenty changes of speed between 16 and 304 revolutions per minute. These speeds are arranged in 5 sets of 4 automatic changes and any group of the automatic changes can be quickly obtained by conveniently located pick off gears.

FEED BOX UNITS—The 5-D Power Flex provides 24 speeds arranged in geometric progression from .007 to .165 or from .007 to .083 inches per spindle revolution. Feeds are arranged in coarse, medium and fine groups.

TURRET AND SLIDE UNIT—Turret slide is of rigid construction and provided with hardened and ground steel inserts which serve as bearings on hardened and ground steel base ways. This construction, together with a liberally dimensioned turret which is automatically clamped in position after indexing, are features which are important contributions to the performance results achieved by P&J automatics.

POTTER & JOHNSTON MACHINE CO., PAWTUCKET, R.I., U.S.A.

Automatic Machine Tools

FACTORY REPRESENTATIVES: William L. Martin, Headquarters at Factory: New England States and Eastern New York and New Jersey; A. W. Stone, 986 Kenyon Ave., Plainfield, N. J.: Western New York and New Jersey, Eastern Pennsylvania, Maryland and Delaware; G. Tell DuBois, 8-154 General Motors Building, Detroit, Michigan: Michigan and the City of Toledo, Ohio; Louis K. Voelk, 14014 Woodworth Road, East Cleveland Ohio: Ohio — with the exception of Toledo, and Western Pennsylvania: Harry I. Schuster, 743 N. Fourth St., Milwaukee, Wisconsin: Illinois, Missouri, Wisconsin, Iowa and Indiana. AGENCIES: Star Machinery Company, 1741 First St., South, Seattle, Washington; Henes-Morgan Machinery Co., 2026 Santa Fe Ave., Los Angeles, Calif.; Jenison Machinery Co., 20th and Tennessee Sts., San Francisco; Wessendorff, Nelms & Co., Inc., 320 Franklin Ave., Houston, Texas; Arthur Jackson Machine Tool Co., 60 Front St., West, Toronto 2, Ontario, Arthur Jackson Machine Tool Co., 437 Grosvenor Ave., Montreal, Canada; Burton Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France: Rotterdam, Holland and Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Voghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan; (Imperial Export Co., 44 Whitehall St., New York, N. Y.); Almacoa, Zurich, Switzerland.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Anaconda Wire & Cable Co., 25 Broadway, New York, plans one-story addition, 76 x 140 ft., to branch plant at Orange, Cal., for storage and distribution. Cost close to $50,000 with equipment. W. J. Moran, 1011 South Fremont Avenue, Alhambra, Cal., is engineer for design and erection.

Continental Can Co., 100 East Forty-second Street, New York, has let general contract to Dawson Brothers Construction Co., Union Building, Syracuse, N. Y., for one-story addition, 125 x 200 ft., to branch plant at Syracuse, for storage and distribution. Cost close to $80,000 with equipment.

Commanding Officer, Watervliet Arsenal, Watervliet, N. Y., asks bids until May 14 for gages (Circular 626), also May 15 (Circular 631), and May 17 (Circulars 628 and 630); until May 21, one 10 x 24-in. universal threadmiller (Circular 613).

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans manual training department in new three-story and basement high school at Baisley Park, Queens, for which a building permit has just been issued. Cost about $1,300,000. Eric Kebbon, architect, 49 Flatbush Avenue Extension, Brooklyn, is in charge.

Robert Gair Co., 155 East Forty-fourth Street, New York, corrugated shipping containers, floor display stands, etc., has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, Hartford, Conn., for new one-story plant, about 80,000 sq. ft. floor space, at Portland, Conn. Cost about $135,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, Hartford, are architects and engineers.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 13 for connectors, junction boxes, mountings and socket caps (Circular 428); until May 17, 450 mast bases and 1800 mast sections (Circular 408); until May 21, 8800 ft. of cable and reels (Circular 418).

United States Engineer Office, Army Building, New York, asks bids until May 14 for four pump impellers, two impeller shafts with sleeves and nuts, six suction swivel pipes, two Y-pipe flap valve shafts, four discharge bends, one propeller tail shaft, six Y-pipe covers and other parts for suction dredges (Circular 279).

Brooklyn Edison Co., 383 Pearl Street, Brooklyn, has let general contract to Skinner, Cook & Babcock, Inc., 60 East Forty-second Street, New York, for one-story equipment and service building, with garage, and for improvements in two-story building on neighboring site. Cost over $200,000 with equipment.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Slocum, N. Y., asks bids until May 14 for one motor-driven, overhung-type woodworking machine, four saw blades and two miter saw blades (Circular 842-60).

Barber Asphalt Corp., Perth Amboy, N. J., has let general contract to M. W. Kellogg Co., 225 Broadway, New York, for extensions and improvements in refinery, including tanks, piping and other equipment. Cost about $225,000.

Griffith Laboratories, Inc., 1415 West Thirty-seventh Street, Chicago, food packer's supplies, plans new one and two-story factory branch, storage and distributing plant, 100 x 220 ft., at Newark, N. J. Cost close to $90,000 with equipment. William E. Lehman, 972 Broad Street, Newark, is architect. A. Epstein, 2000 West Pershing Road, Chicago, is engineer.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until May 20 for two automatic drilling time-train ring machines (Circular 1417).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 14 for 200 rotary reversible pneumatic tapping machines (Schedule 1499), seamless steel tubing (Schedule 1549), 700 fuel quantity aircraft gages (Schedule 1571) for Philadelphia Navy Yard; until May 17, steel valves (Schedule 1534) for Philadelphia and Brooklyn yards.

B. F. Goodrich Co., Akron, Ohio, automobile tires and tubes, has let general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for several one-story additions to branch mill at Oaks, near Philadelphia, for increase in production, storage and distributing divisions. Cost close to $300,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, Mich., is architect and engineer.

Board of School Directors, Township of Upper Chichester, William J. Getty, Jr., Boothwyn, Pa., secretary, asks bids until May 25 for equipment and supplies for machine shop, wood-working and electrical shops at school.

Commanding Officer, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, asks bids until May 15 for one hydraulic heating press (Circular 1684).

BUFFALO DISTRICT

Rane Tool Co., Inc., Ross Street, Jamestown, N. Y., tools, dies, jigs, etc., has let general contract to Warren Construction Co., 335 Steele Street, for one-story addition. Cost close to $50,000 with equipment.

American Car & Foundry Co., 370 Babcock Street, Buffalo, is making improvements in local plant, closed for some time, preparatory to resumption of operations for production of munitions, for which company is said to have secured large contract. Charles T. Hertsch, heretofore division manager at car-building works at Jeffersonville, Ind., will be in charge at Buffalo plant.

Remington-Rand, Inc., 465 Washington Street, Buffalo, has let general contract to Henry W. Streeter Corporation, 608 William Street, for one-story addition to plant at Elmira, N. Y., 80 x 250 ft., and improvements in present building. Cost over $175,000 with equipment.

NEW ENGLAND

Seamless Rubber Co., 253 Hallock Avenue, New Haven, Conn., has let general contract to Dwight Building Co., 67 Church Street, for one-story addition, 130 x 130 ft., for storage and distribution. Cost close to $50,000 with equipment. Harold H. Davis, 29 Whitney Avenue, is architect and engineer.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Ethan Allen, Vt., asks bids until May 17 for one steam boiler, with forced-draft blower and automatic combined feed water and low water cut-off (Circular 107-28).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 17 for 25 two-wheel trucks assembled, for Newport, R. I., Naval Station (Schedule 1587).

Moore Special Tool Co., 358 John Street, Bridgeport, Conn., has let general contract to E. & F. Construction Co., 94 Wells Street, for new two-story plant on Union Avenue. Cost close to $50,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until May 13 for three precision bench grinders (Circular 374), parts for automatic rifles, caliber 0.30, assembly bipods, friction washers, front sight blades, stock rests, stock rest bushings, elevating screws, etc. (Circular 361); until May 14, 1000 hook, riffling head, high-speed steel cutters (Circular 371); until May 16, six-spindle automatic screw machine (Circular 369).

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 14 for winch anchor stakes and blacksmith sledges, 10-lb., with handle (Circular 398-206).

Civil Aeronautics Authority, Washington, asks bids until May 14 for cable terminal boxes, with adaptors and connecting blocks (Circular 429); until May 20, galvanized thimbles for wire rope, forged clevises, galvanized eyebolts, nails, insulators, conduit, 24,000 ft. of antenna wire, 8400 ft. of galvanized cable, 3600 ft. of galvanized wire rope, and 13,200 ft. of parkway cable (Circular 428).

General Purchasing Officer, Panama Canal, Washington, asks bids until May 13 for 250,000 ft. of copper wire, 60,000 ft. of heat-resisting fixture wire, 1000 lb. of copper wire, 20,000 ft. of rubber-insulated cable, 14,000 ft. of copper cable, 2000 ft. of flexible armored cable, 30,000 ft. of copper flexible cord, 110,000 ft. of lamp cord, wire-pulling grips, potheads, conduit bushings, etc. (Schedule 4040); 47,200 lb. of bolts and washers (Circular 4032); until May 14, 25,000 ft. of wire rope, 80,000 ft. of wire rope, 3000 ft. of steel wire rope, 3000 ft. of galvanized steel guy wire, 33,000 lb. of soft steel wire, 297,000 lb. of steel wire nails, 51,000 lb. of steel wire nails, 10,000 lb. of galvanized flooring nails, 10,000 lb. of galvanized roofing nails, 7000 lb. of galvanized boat spikes, 256 tackle blocks, four cargo hoister tackle blocks, 1000 steel paint drums (Circular 4029).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 14 for two heavy-duty electric trucks, hydraulic elevating platform (Schedule 1543) for Alexandria, Va., yard; motor-driven air compressor (Schedule 1560), 80 radial roller bearings (Schedule 1580), roller path forgings (Schedule 1608) for Washington yard; portable lift jacks (Schedule 1478), naval brass boat facings (Schedule 1496), combustible gas indicators (Schedule 1476); until May 17, drill chucks (Schedule 1527), cable (Schedule 1517), aircraft washers and screws (Schedule 900-3096) for Eastern and Western Navy yards.

SOUTH ATLANTIC

Hartness Bottling Co., Greenville, S. C., has let general contract to W. M. Fine, Spartanburg, S. C., for one-story mechanical-bottling, storage and distributing plant. Cost close to $40,000 with equipment. W. Paul Williams, Spartanburg, is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for water-treatment plant at Charleston, S. C., Navy Yard, including water-softening equipment, deaerating feed water heater, chemical feed apparatus, control equipment, instruments, piping, etc. (Specifications 9785).

Light and Water Department, Lakeland, Fla., Charles Larsen, superintendent, asks bids until May 14 for one integral furnace steam generating unit, steam capacity 65,000 lb. per hr., for municipal power plant.

SOUTH CENTRAL

Armour & Co., Union Stock Yards, Chicago, meat packers, have filed plans for one-story and basement addition to branch plant at 115-19 East Jackson Avenue, Knoxville, Tenn., to replace a structure recently damaged by fire. Cost over $45,000 with equipment.

P. M. B. Self, care of George C. Morgan, 2020 Eleventh Avenue South, Birmingham, architect, has let general contract to Muskogee Iron Works, Muskogee, Okla., for new cottonseed oil mill on 8-acre tract near Marks, Miss., consisting of main mill, 40 x 200 ft.; seed house, 90 x 200 ft., with mechanical-cooling apparatus; combination seed and hull house, 60 x 100 ft.; storage, distributing and bagging plant, 50 x 200 ft., all one-story, with boiler house, machine shop and other units. Cost close to $100,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 15 for one gasoline engine radial gate hoist for lowering and raising gates at Hiwassee Dam, load capacity 80,000 lb.; until May 20, galvanized steel towers for power transmission line from Columbia to Nashville, Tenn.

SOUTHWEST

American Asphalt Roof Corp., Fifteenth Street and Blue River Avenue, Kansas City, Mo., has let general contract to Thomas S. Byrne, Fort Worth National Building, Fort Worth, Tex., for new plant on West Fifth Street, Fort Worth, where 11-acre tract has been acquired. Initial plant will consist of two main one-story units, 80 x 300 ft., and 45 x 250 ft., and auxiliary structures, with boiler house, machine shop and other departments. Cost over $200,000 with machinery. Later company plans additional buildings for asphalt paint and roof coating manufacture.

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and other projects. Wyatt C. Hedrick, First National Building, Fort Worth, is architect. C. R. Sculley is company engineer in charge.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., has let general contract to George Senne & Co., 510 East Fifteenth Street, for one-story addition, 20 x 320 ft., at local car and locomotive shops, for expansion in steel coach department. Cost about $65,000 with equipment. H. W. Wagner is chief engineer.

International Harvester Co., 180 North Michigan Avenue, Chicago, Motor Truck Division, has leased one-story building to be erected by Turner Motor Co., 414 Missouri Street, Weslaco, Tex., for new factory branch, storage and distributing plant.

Braniff Airways, Inc., Love Field, Dallas, Tex., and City Aviation Board are planning joint construction of new hangar and shop at airport, to be used by Braniff company. Cost about $250,000 with equipment, of which $77,000 will be defrayed by company and remainder by municipality, which has arranged for Federal grant of $52,000 as part of fund.

City Council, Lebanon, Mo., plans extensions and improvements in municipal power plant, including new 1500-kw. turbine-generator unit and auxiliary equipment.

WESTERN PA. DIST.

Hammermill Paper Co., Lake Shore Road, Erie, Pa., writing papers, etc., has let general contract to Henry Shenk Co., 1115 Sassafras Street, for one-story addition, 120 x 140 ft., for storage and distribution. Cost over $60,000 with equipment.

Pennsylvania Turnpike Commission, 11 North Fourth Street, Harrisburg, Pa., Paul B. Noftsker, secretary and treasurer, asks bids until May 14 for five repair and maintenance buildings at Donegal, Westmoreland County (Schedule 1), near Husband, Somerset County (Schedule 2), Kegg, Bedford County (Schedule 3), near Burnt Cabins, Huntingdon County (Schedule 4), and near Newville, Cumberland County (Schedule 5).

United States Engineer Office, Huntington, W. Va., asks bids until May 15 for two steam, double-cylinder, single-drum hoisting engines (Circular 186).

OHIO AND INDIANA

Humphryes Mfg. Co., East Fifth Street and Newman Avenue, Mansfield, Ohio, pumping machinery and parts, plumbing fixtures, etc., will take bids soon on general contract for three-story addition, 52 x 125 ft. Cost over $80,000 with equipment. George Rider Co., Terminal Tower Building, Cleveland, is architect and engineer.

Mueller Electric Co., 1577 East Thirty-first Street, Cleveland, electric testing equipment, radio apparatus, etc., has let general contract to A. M. Higley Co., 2036 East Twenty-second Street, for one-story addition, 45 x 125 ft. Cost close to $50,000 with equipment. George Rider Co., Terminal Tower Building, is architect and engineer.

Kraft-Phenix Cheese Corp., 500 North Peshtigo Street, Chicago, food products, has acquired tract, 150 x 335 ft., at 2044-50 Lakeside Avenue, N. E., Cleveland, for one-story factory branch, storage and distributing plant, about 40,000 sq. ft. floor space, for which bids will be asked soon on general contract. Cost close to $100,000 with equipment. Cleveland offices are at 3542 Croton Avenue South.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until May 13 for air gage chuck swivel nuts, chuck nuts, chuck gaskets, chuck screw assemblies and air gage chuck valve screw nuts, etc. (Circular 1450); until May 14, 109,250 wire cable thimbles (Circular 1469); until May 15, electric power plant (Circular 1474), magneto and distributer assemblies (Circular 1458), dies, reamers, taps, etc. (Circular 1478); until May 16, 300 hand-type tube benders (Circular 1477), 2000 ft. of extra flexible steel cable and 2000 ft. of corrosion-resistant steel cable (Circular 1482), 12,000 lb. steel strapping and 30,000 seals (Circular 1480).

Board of Public Works, City Hall, Frankfort, Ind., asks bids until May 14 for steam turbine-generator unit, surface condenser and auxiliary equipment for municipal power plant expansion and improvements. Froehlich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

MICHIGAN DISTRICT

Peninsular Steel Co., 1030 McDougal Street, Detroit, has begun erection of one-story addition for storage and distribution, for which general contract recently was let to W. J. C. Kaufmann Co., 10610 Shoemaker Street. Cost close to $40,000 with equipment.

Michigan Consolidated Gas Co., 415 Clifford Street, Detroit, plans rebuilding part of standby gas-generating station at Tireman Avenue and Epworth Boulevard, damaged by fire April 26. Loss close to $40,000 with machinery.

Industrial Brownhoist Corp., Bay City, Mich., cranes, hoists, conveyors, etc., plans one-story addition to branch plant at Elyria, Ohio, for which bids are scheduled to be asked on general contract in June. Cost about $125,000 with equipment.

Board of Education, Benton Harbor, Mich., plans one-story vocational shop at high school. Cost about $45,000 with equipment. Warren S. Holmes, Lansing, Mich., is architect.

MIDDLE WEST

Symons Clamp & Mfg. Co., 4249 West Diversey Boulevard, Chicago, column clamps, building shores and kindred heavy products, has let general contract to A. S. Low, 510 North Dearborn Street, for one-story addition, 116 x 139 ft., for storage and distribution. Cost over $45,000 with equipment. W. H. Farnum, last noted address, is architect.

Belmont Radio Corp., 1257 West Fullerton Avenue, Chicago, has acquired former buildings of Grisby-Grunow Co., Dickens Avenue, for reported price of $255,000, for plant, expanding present capacity.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until May 27 for terminal strips (Circular 248); until May 28, generators, cranks, jacks, etc. (Circular 257).

Minnesota Mining & Mfg. Co., Forest Avenue, St. Paul, Minn., abrasive products, roofing granules, etc., plans one-story addition to raw material mill at Wausau, Wis., about 10,000 sq. ft., for storage and distribution. Cost about $45,000 with equipment. Toltz, King & Day, Inc., Pioneer Building, St. Paul, is architect.

Coca-Cola Bottling Co., North Platte, Neb., plans one-story mechanical-bottling, storage and distributing plant at Ogallala, Neb. Cost close to $75,000 with equipment. C. C. Coursey, North Platte, is architect.

Garden City Plating & Mfg. Co., 1430 South Talman Avenue, Chicago, plated metal wares, plans two-story and basement addition. Cost close to $45,000 with equipment. Himelblau & Spitz, 220 South State Street, are architects.

Engesser Brewing Co., St. Peter, Minn., plans rebuilding part of plant, including two buildings, recently destroyed by fire. Loss close to $80,000 with equipment.

Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., has approved plans for three-story addition to paper mill at Stevens Point, Wis., 37 x 110 ft., for storage and distribution. Cost over $50,000 with equipment.

State Director of Purchases, 19 State Capitol, St. Paul, Minn., asks bids until May 14 for four bituminous mixing machines for State Highway Department (Req. 31317).

PACIFIC COAST

Hoffman Brothers Meat Co., 3315 East Vernon Avenue, Vernon, Los Angeles, meat packer, has let general contract to H. Gorelnik, 117 South Poinsettia Place, Los Angeles, for one-story packing plant, 80 x 112 ft., at 2731 South Soto Street, Vernon. Cost close to $45,000 with equipment. M. J. Garbielson, 6362 Hollywood Boulevard, is engineer.

Constructing Quartermaster, Alaskan Air Base, Fort Mason, Cal., asks bids until May 15 for equipment and supplies for power plant at Cold Weather Experimental Station, Fairbanks, Alaska, including one 5-ton handpower crane, hand-power hoist, etc. (Circular 6808-73).

Trailer Co. of America, Inc., 600 Third Street, Oakland, Cal., motor trailers and parts, has let general contract to H. J. Christensen Co., and Lyons Construction Co., 2069 Pacific Avenue, Alameda, Cal., for new one-story plant, 100 x 320 ft., at Berkeley, Cal., for parts production and assembling. Cost close to $150,000 with equipment. Alben Froberg, 1955 Webster Street, Oakland, is architect.

Water Board, Eugene, Ore., asks bids until May 20 for equipment for new municipal steam-electric power plant, for standby service in conjunction with present hydroelectric power station, including watertube boiler and auxiliaries, 7500-kw. steam turbine-generator unit and accessories, and surface condenser and accessories.

Public Works Officer, Puget Sound Navy Yard, Bremerton, Wash., asks bids until May 22 for docking gear building, galley and latrine for drydock No. 4 (Specifications 9637).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 14 for one motor-driven air compressor for Seattle (Schedule 1611), stockless steel anchors for Tiburon, Cal. (Schedule 1490), motor-driven grinder (Schedule 1505), four motor-driven millers (Schedule 1486); until May 17, socket wrenches (Schedule 1530), motor-driven plate-bending roll (Schedule 1498); until May 21, gear-driven metal-cutting alligator shears (Schedule 1563), insulated electric cable (Schedule 1566) for Mare Island Navy Yard; until May 14, motor-driven, metal-cutting hack saw (Schedule 1488); until May 24, power-driven hack saw (Schedule 1577) for San Diego Naval Air Station.

CANADA

Continental Can Co., Ltd., New Toronto, Toronto, has let general contract to Foundation Co., Ltd., 1158 Bay Street, for two-story and basement addition, 150 x 200 ft. Cost close to $200,000 with equipment.

Lipman Brothers, 251 Mutual Street, Toronto, art metal products, plated wares, etc., have leased building at 47 Davies Avenue, about 12,000 sq. ft. of floor space, for plant, expanding present capacity.

Canadian Car & Foundry Co., Ltd., 621 Craig Street West, Montreal, Que., plans new one-story plant at Amherst, N. S. Cost close to $85,000 with equipment.

Dominion Department of Public Works, Ottawa, has let contract to Standard Construction Co., 101 Upper Water Street, Halifax, N. S., for $65,000 addition to H.M.C. dock yard at Halifax.

Dominion Engineering Co., Lachine, Que., has awarded contract to Hyde & Miller, Montreal, for plant addition.

Howard Smith Paper Mills, Ltd., 407 McGill Street, Montreal, has awarded structural steel contract to Dominion Bridge Co., Ltd., Lachine, Que., and contract for tie rods to Steel Co. of Canada, Ltd., 525 Dominion Avenue, Montreal, for wharf addition and stackers at Cornwall, Ont. General contract has been placed with Foundation Co. of Canada, Ltd., 1538 Sherbrooke Street West, Montreal.

Ottawa Electric Co., Ottawa, Ont., W. H. Munro, general manager, will build 4000-kw. sub-station on Nelson Street, to cost $125,000.

Canadian Government officials announce that site has been purchased near Brantford, Ont., for airport and training center for British Commonwealth Air Training Plan, to cost $1,000,000. Construction work will start this month.

McKinnon Industries, Ltd., Ontario Street, St. Catharines, Ont., has awarded contract to Newman Brothers, 127 St. Paul Street, for $47,000 plant addition.

Canadian Kodak Co., Ltd., Eglington Avenue, Toronto, has acquired 16 acres adjoining its plant and will build addition to cost $75,000.

FOREIGN

Colonial Sugar Refining Co., Ltd., Sydney, New South Wales, Australia, has approved plans for addition to branch plant at Yarraville, Melbourne, Victoria, for production of industrial alcohol, using molasses as raw material under an extraction process, comprising three-story still house, 33 x 55 ft.; one-story building for fermenting process department and another one-story unit, 75 x 150 ft., for storage and distribution. Large storage tanks also will be built. Cost close to $500,000 with machinery.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, plans new branch plant at Melbourne, Victoria, Australia, for production of a line of specialties. Cost over $150,000 with equipment.